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THE AFRICAN DICHAPETALACEAE IV

*A taxonomical revision.
This second instalment of the revision of
Dichapetalum
contains the treatment of the species c-f*

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INTRODUCTION AND ACKNOWLEDGEMENTS

This publication is the fourth in a series dealing with African *Dichapetalaceae*: the three preceding issues have been published in 1969, 1970, and 1973 respectively. The revision of the genus *Dichapetalum* is continued by the species c–f. It was initiated in 1973 by a first instalment comprising the species a–b.

As before, all specific names, whether validly published or not, are treated in alphabetical order. In the series c–f 14 names proved to represent distinct species and one species, *D. dewildei*, is described for the first time. In 2 species 2 varieties have been distinguished.

All specimens cited have been examined by the author. Their arrangement is as in the preceding part, i.e. geographical arrangement of the countries and alphabetical arrangement according to collector's name within the countries.

The author is grateful to the directors and curators of the herbaria cited, of which a list is published in the preceding instalment, for their continued loan of material, also to the curator of the herbarium of the Missouri Botanical Garden, Saint Louis, U.S.A.

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TAXONOMIC TREATMENT SPECIES C–F

D. cazengoense Exell & Mendonça = *D. ruhlandii* Engl.

D. cazengoense Exell & Mendonça, 1951-a: 108: 1951-b: 323: Breteler, 1973: XVI, XIX: Punt, 1975: 21. Type: Angola, Cuanza Norte, Cazengo, between Monte Belo and Queta, near Monte Lau, *Gossweiler 1641* (holotype: BM: isotype: COI).

Note. The authors compared *D. cazengoense* with *D. venenatum* Engl. & Gilg (= *D. cymosum* (Hook.) Engl.) to which it is indeed closely related. That ENGLER's highly artificial classification (1912-a) did not reveal any affinity to

D. ruhlandii is not amazing. Although the areas of distribution of *D. cazengoense* and of *D. ruhlandii* s.s. are widely separated, no justification can be found to maintain the former as a distinct taxon.

***D. chalotii* Pellegr.**

Fig. 1 Map 1

D. chalotii Pellegrin, 1912: 272: 1913: 645: De Wildeman, 1919: B23: Exell, 1927: 67: Exell & Mendonça, 1951-b: 326: Hauman, 1958-a: 334: Breteler, 1973: 18, XVI: Punt, 1975: 40.

Type: Congo, Brazzaville, *Chalot 13* (holotype: P: isotype: WAG).

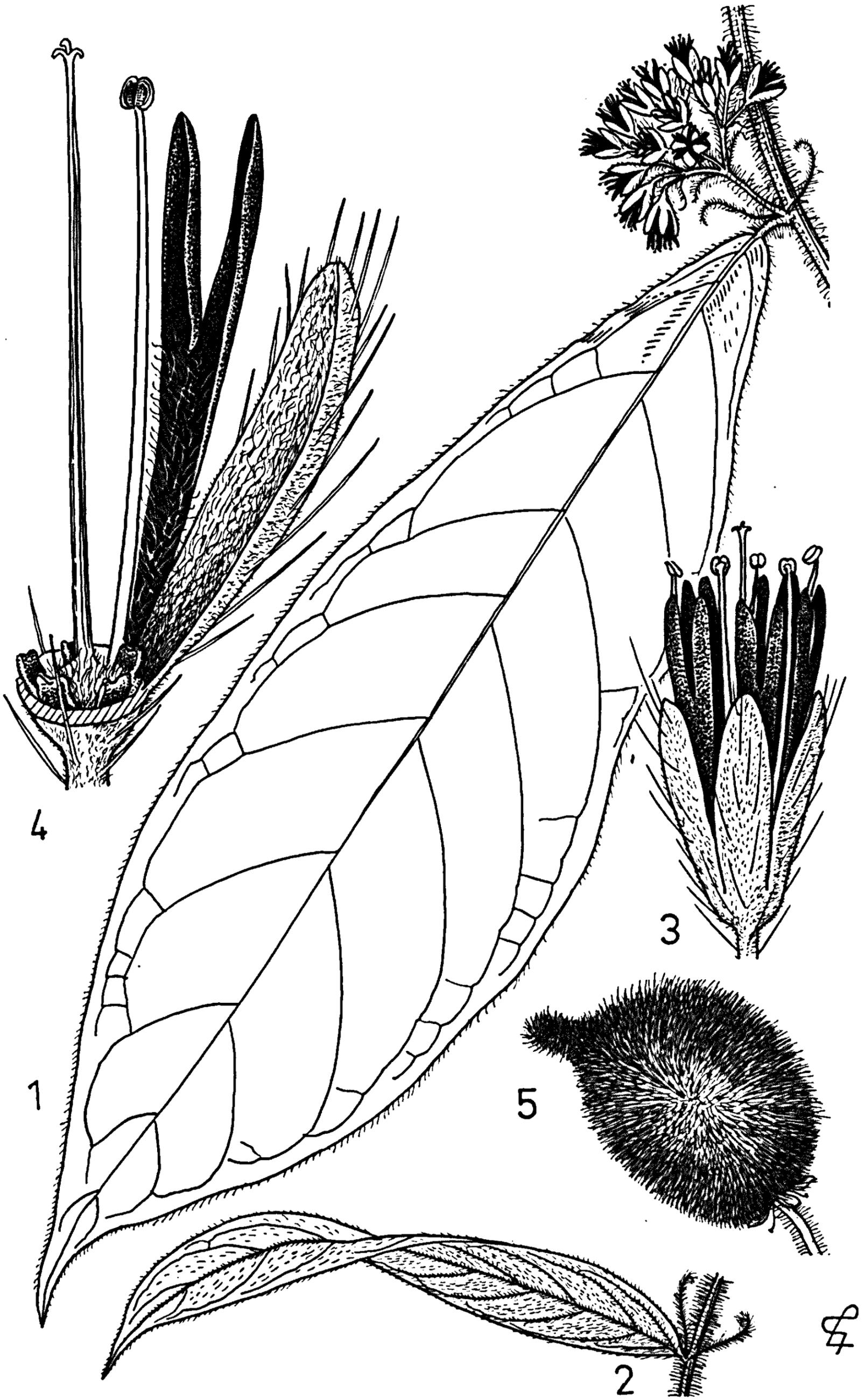
D. chalotii Pellegrin var. *tholloniana* Pellegrin, 1912: 272: 1913: 645: De Wildeman, 1919: B23 (as var. *thollonii*). Type: Congo, Brazzaville, *Thollon 553* (holotype: P).

D. sapinii De Wildeman, 1919: B64; Hauman, 1958-a: 334; Breteler, 1973: XVI. Type: Zaïre, Kasai, Lukombe, Oct. 1910, *Sapin s.n.* (lectotype: BR: isotype: WAG).

Diagnostic characters. Hispid liana or shrub with hollow branches and branchlets and simple, slender, usually curved stipules. Leaves papery, subsessile to shortly stalked, usually with an obtuse to subcordate base and an acute acumen, strigose, more densely so and longer persistent below. Inflorescences distinctly stalked, 2–3 times distinctly branched, up to 20-flowered, hispid, with curved, threadlike bracts and bracteoles. Flowers rather large, up to 10 mm long: petals hairy inside, black when dry. Fruit densely hispid, distinctly apiculate.

Description. Medium sized liana, lianescent shrub, or shrub. *Stem* lenticellate, the lenticels not very prominent, in rows or not: the woodcylinder divided by intruding phloem in 5 distinct lobes. *Branches* and *branchlets* hollow, brown to silverish-brown, densely brown-hispid, glabrescent with age. *Stipules* linear-triangular to subulate, usually curved, (3)7–10(13) mm long, hispid, early caducous or not. *Leaves* usually subsessile, the petiole 1–3(6) mm long, grooved above, hispid: blade papery, elliptic to obovate, often narrowly so, (2)2.5–3(4) times as long as wide, (5)10–16(22) × (2)3–6(8) cm, obtuse to subcordate at base, gradually (sometimes abruptly) acutely acuminate at top, the acumen up to 2 cm long: midrib, with (6)8–11(13) main lateral nerves on each side, impressed above, prominent below: both sides strigose, more densely so and longer persistent below and on midrib above: glands small, inconspicuous, below only. *Inflorescences* rather loose, hispid, distinctly pedunculate, distinctly 2–3 times branched, up to 20-flowered: peduncle 4–8(12) mm

FIG. 1. *D. chalotii*: 1. part of flowering branch, 1 × : 2. part of branchlet with narrow leaf and stipules, 1 × : 3. flower, 6 × : 4. part of flower showing sepal, petal, stamen, pistil, and staminodes, 12 × : 5. fruit, 1 ×. (1,3–4. *Jans 304*; 2. *Le Testu 7191*; 5. *Devred 2862*).

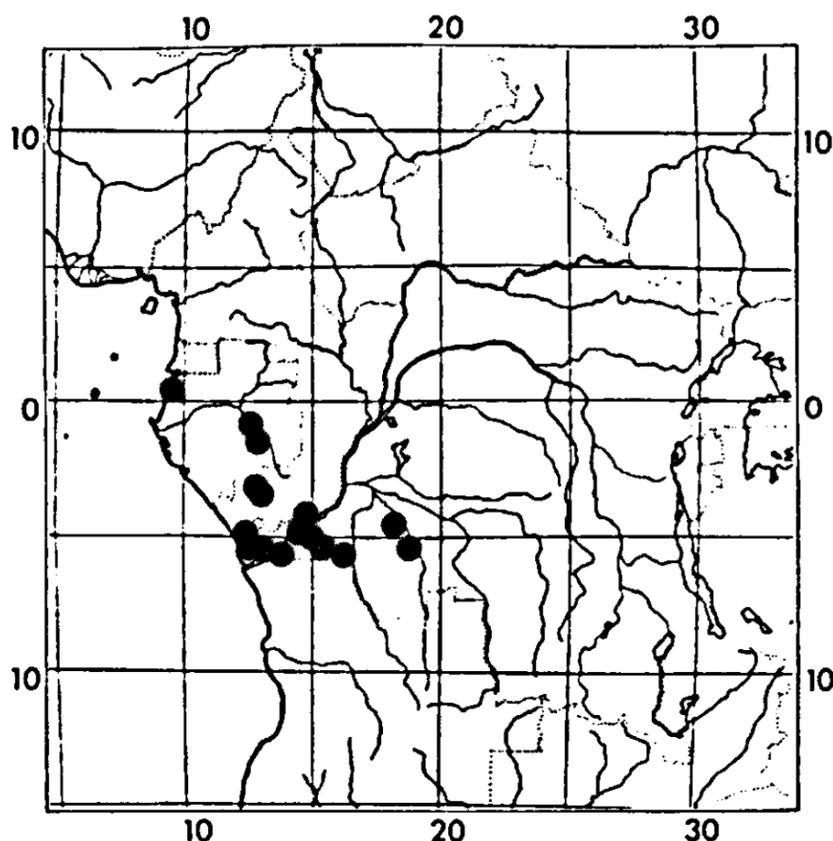


long: bracts and bracteoles narrowly triangular to subulate, usually curved, 3–6(10) mm long. *Pedice*l up to 4 mm long, the upper part usually short but distinct, 0.5–1(2) mm long, puberulous-tomentellous, usually mixed with some hispid hairs. *Calyx* rounded to obtuse at base. *Sepals* erect, loosely spreading, or reflexed, slightly united at base, usually narrowly oblong, sometimes elliptic or obovate, (3)4–6 × 1–1.5(2) mm, obtuse, rounded, or acute, often mucronate at top, tomentellous to appressed-puberulous mixed with long hispid hairs outside, appressed-puberulous inside at least in the upper part. *Petals* erect or nearly so, free or adnate to the stamens at base, obovate to narrowly obovate-spathulate in outline, (3.5)5–7(8) mm long, 1–3.5 mm split, usually glabrous outside, inside pubescent mainly from split downwards: lobes concave. *Stamens* erect, (4.5)6–8(9.5) mm long, glabrous; anthers ca 0.5 mm long, connective prominent. *Staminodes* free, subquadrate, at most 1 × 1 mm, truncate-emarginate at top, glabrous or with a few hairs inside. *Pistil* erect, (5)6–9(10.5) mm long: ovary depressed subglobose, 3-locular, usually velutinous, seldom glabrous: style glabrous, 3-lobed at top. *Fruits* usually (?) 1-seeded, subglobose to ellipsoid, up to 3 × 2 × 2 cm, abruptly apiculate (up to 1 cm), densely dark-brown hispid: exocarp and mesocarp rather thin, at most 1 mm thick: endocarp pergamentaceous, smooth, glossy, and glabrous inside. *Seeds* subglobose to ellipsoid, up to 15 mm in diam., with a dull, brown, rugose testa.

Distribution: Western Central Africa (Gabon, Congo, Zaïre, Angola).
Ecology: Rain forest, gallery forest.

Specimens examined:

Gabon, Libreville, *Baudon* 218 (BR); km 15 Moanda-Bakoumba, *Breteler* 6450 (WAG); 6459 (WAG); 4 km S.W. Lastoursville, *Breteler* 6614 (WAG); km 6 Moanda-Bakoumba, *Breteler* 6754 (WAG); km 11 Moanda-Franceville, *Breteler* 6798 (WAG); km 6 Moanda-Franceville, *Breteler* 7000 (WAG); Lastoursville, *Le Testu* 7191 (BM, BR, P); 8477 (BM, BR, P, WAG).



MAP 1. *D. chalotii*

Congo. Mitsiba, *Bouquet 1070* (P); km 45 Komono-Mossendjo, *Bouquet & Sita 2359* (WAG); Monts Abonogo, Ngouma, *Bouquet & Sita 2404* (IEC); Brazzaville, *Chalot 13* (P, WAG, type); *Chevalier 11203* (P); Plateau des Cataractes, Boko region, *de Néré 423* (WAG): 23 km from Brazzaville, crossing with Djili R., *de Néré 1222* (P); km 45 Brazzaville-Foulakari, *Descoings 9590* (MPU); 9592 (MPU, P, WAG); Plateau des Cataractes, border of Djoué near Kibossi, *Descoings 9791* (IEC) (under this number has also been collected a specimen of *D. lujaei*); Brazzaville, *Koechlin 411* (P); *Sita 423* (MPU, P); *1206* (IEC, P); *Thollon 553* (P, type of *D. chalotii* var. *tholloniana*).

Zaire. Mbenge, *Bittremieux 211* (BR); Lemfu, *Butaye in Gillet 2268* (BR); Kisantu, Kibambi, *Callens 3760* (BR); sin. loc., *Caha 68* (BR); Matadi-Kinshasa, between Songola and Kizulu Rd., *Compère 970* (BR); Zaza, *Compère 1088* (BR); Kiyaka, Kwango, *Devred 2862* (BR); Kiobo, *Donis 114* (BR); Luki, *Donis 1635* (BR); 2089 (BR, K); 2346 (BR); Bingila, *Dupuis s.n.* (BR); Kinshasa, *Jans 304* (BR, K, WAG); Luki, *Maudoux 93* (BR, EA, K, LISC, PRE, WAG); 191 (BR, LISU); 285 (BR); Kalama, *Pauwels 821* (BR); Lukombe, Oct. 1910, *Sapin s.n.* (BR, WAG, type of *D. sapinii*); Dec. 1910, *Sapin s.n.* (BR, WAG); Kasai, s.l., Oct. 1910, *Sapin s.n.* (BR); Luki, *Toussaint 84* (BR, COI, SRGH); 2080 (BR); 2143 (BR, K).

Angola. Maiombe, Panga Mungo, *Gossweiler 6270* (BM, COI, K, LISU); Maiombe, Bucu Zau, *Gossweiler 6760* (BM, COI, K, LISU); Maiombe, Panga Mungo – Subluali, *Gossweiler 6840* (BM, COI, K, LISU); Maiombe, Bucu Zau, *Gossweiler 6899* (BM, COI, LISU); Cabinda, Chiaca, *Teixeira & Gerez 7510* (LISC) (under this number has also been collected a specimen of *D. bangii*).

Notes. By its pollen PUNT (1975: 40) placed *D. chalotii* in the *D. madagascariense* type together with *D. gabonense* Engl. and *D. madagascariense* Poir. In my opinion it is not clear to which species *D. chalotii* is most closely related. By its distinctive characters as the hollow branches and branchlets, the thread-like bracts and bracteoles, and the hairy petals its position is rather isolated.

The type of *D. chalotii* var. *tholloniana* has indeed slightly larger flowers than generally seen in *D. chalotii*, but some intermediates (e.g. *Descoings 9592*, *Jans 304*, *Sita 1206*) are present. Therefore it has not been maintained as distinct.

D. sapinii, already placed in synonymy by HAUMAN (1958-a), is lectotypified by *Sapin s.n.* collected at Lukombe in October 1910.

D. chartaceum (Wright) De Wild. = *D. cymulosum* (Oliv.)Engl.

For details see under *D. cymulosum*, p. 40.

***D. chlorinum* (Tul.)Engl.**

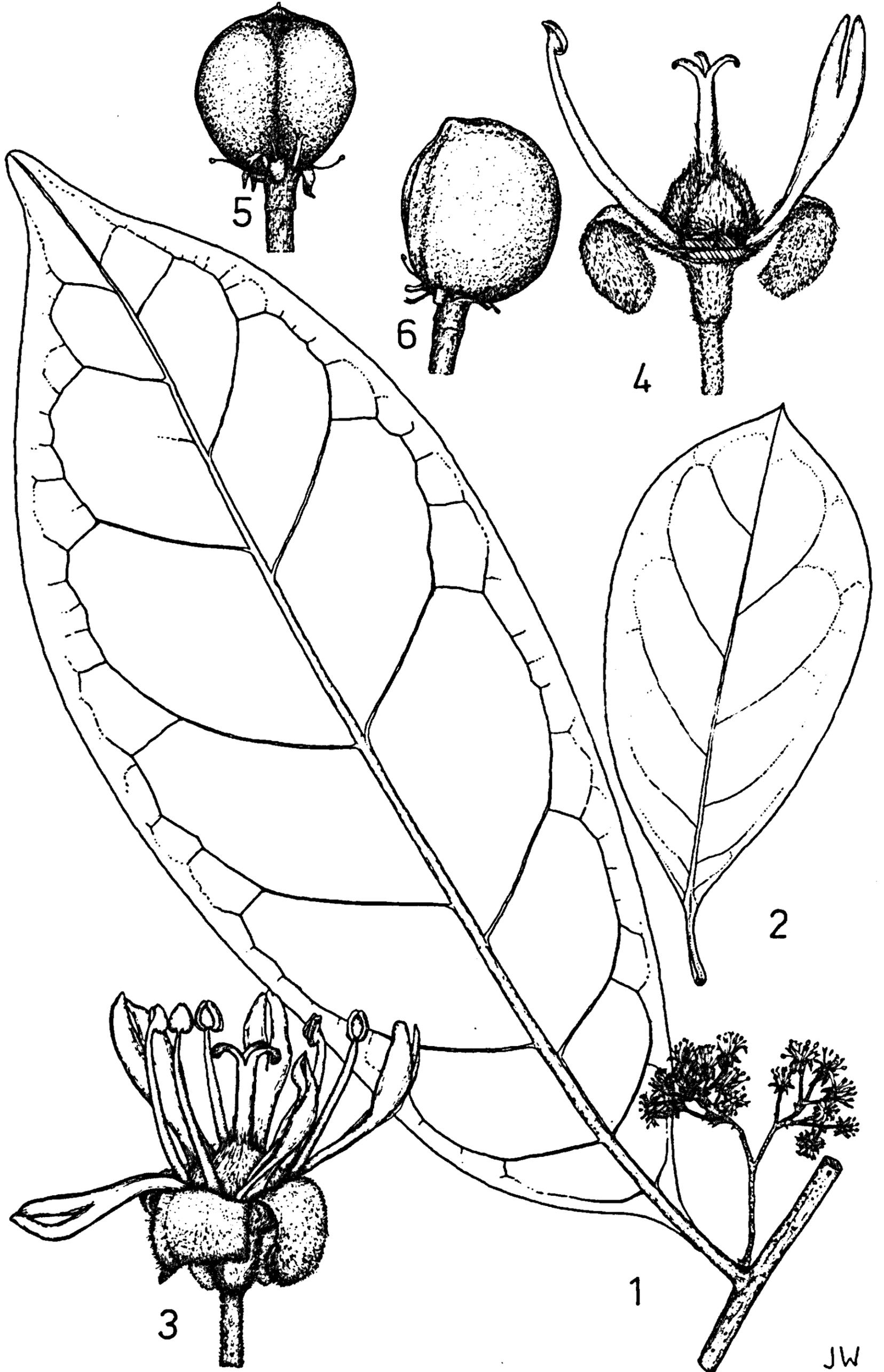
Fig. 2 Map 2

D. chlorinum (Tulasne) Engler, 1896-a: 348; Engler & Krause, 1931: 6; Descoings, 1960: 78; 1961: 10; 1962: 49; 1973: 510; Punt, 1975: 21–22.

Basionym: *Chailletia chlorina* Tulasne, 1857: 88.

Type: Madagascar, sin. loc., *Lastelle s.n.* (lectotype: P).

Diagnostic characters. Liana or lianescent shrub with leathery rather glabrous leaves with a cuneate base and a short apex. Inflorescences often



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grouped on rather short or long leafless axillary shoots, distinctly pedunculate, distinctly branched, up to 50-flowered, the peduncle adnate to the petiole or not. Flower stalk with a distinct upper part. Sepals reflexed. Petals bilobed. Ovary with short, erect hairs.

Description. Liana, lianescent shrub, or (?) tree. *Branches* brown to dark grey to black, lenticellate: *branchlets* yellowish to pale brown, densely appressed-puberulous to tomentellous when young, glabrescent with age. *Stipules* triangular, often early caducous, 1–5 mm long, appressed-puberulous. *Leaves*: petiole semi-terete, grooved or canaliculate above, (2)6–9(12) mm long, appressed-puberulous to tomentellous, often slightly longer than normally seen when adnate to the peduncle: blade coriaceous, elliptic to obovate, sometimes narrowly so, (5)7–12(17) × (2)3–7 cm, 1.5–2.5(3) times as long as wide, cuneate at base, usually shortly acuminate at apex, the acumen up to 1 cm long, both sides sparsely appressed-puberulous when young, more densely so on midrib, soon glabrescent, sometimes pilose domatia present in the axils of the basal main lateral nerves below: midrib flat or slightly impressed above, main lateral nerves not very distinct, 4–6(8) on each side of the midrib: nervation in general prominent both sides, sometimes obscure above: the leaf margin sometimes slightly revolute: glands rather distinct, below only, mainly in the lower half. *Inflorescences* distinctly pedunculate, 1–3 times distinctly branched, up to 50-flowered, often grouped on rather short or long leafless axillary shoots (which might easily be taken for a single inflorescence), densely puberulous-tomentellous: peduncle free or up to 1 cm length adnate to the petiole, (0.5)1–1.5(2) cm long: bracts and bracteoles minute, subdeltoid to subtriangular, at most 1 mm long. *Pedicel* up to ca 5 mm long, the lower part up to 4 mm long, the upper part distinct, 1–1.5 mm long. *Sepals* reflexed, shortly united at base, oblong to ovate, 2.5–3.5 × 1–1.5 mm, puberulous-tomentellous outside, also on apical part inside. *Petals* erect, spreading, or reflexed, at base shortly adnate to the filaments, narrowly obovate-spathulate in outline, 3–4 mm long, 0.5–2.5 mm split, glabrous or with very few hairs inside, outside, or on the margin. *Stamens* erect, usually slightly shorter than the petals, 2.5–3.5 mm long, glabrous; anthers with a prominent connective. *Staminodes* subquadrate to transversely oblong, at most 0.5 × 0.5 mm, glabrous. *Pistil* 3-merous, 2–3.5 mm long: ovary with short erect hairs (velutinous): style glabrous or with a few hairs at base, 3-lobed at top, sometimes split up to the ovary, the lobes up to 1.5 mm long. *Fruit* usually 1-seeded, sometimes 2–3-seeded: 1-seeded fruits: subellipsoid, slightly laterally compressed, up to 1.5 × 1 × 1 cm, densely velutinous-tomentellous: exocarp and mesocarp thin, at most 1 mm thick: endocarp pergamentaceous, smooth, glossy, and glabrous inside. *Seed* subellipsoid, up to ca 1 × 0.5 cm, with a brown testa.

FIG. 2. *D. chlorinum*: 1. part of flowering branch with undersurface of leaf, 1 × : 2. small leaf above, 1 × : 3. flower, 10 × : 4. flower, sepals, petals, and stamens partly removed, 10 × : 5. 2-seeded fruit, 2 × : 6. 1-seeded fruit, 2 × . (1. *Perrier de la Bâthie* 18173; 2. *Perrier de la Bâthie* 6220; 3–4. *Ch. d'Alleizette* s.n.; 5–6. *Capuron* 662).

Distribution: Madagascar.

Ecology: Forests. up to 1300 m alt.

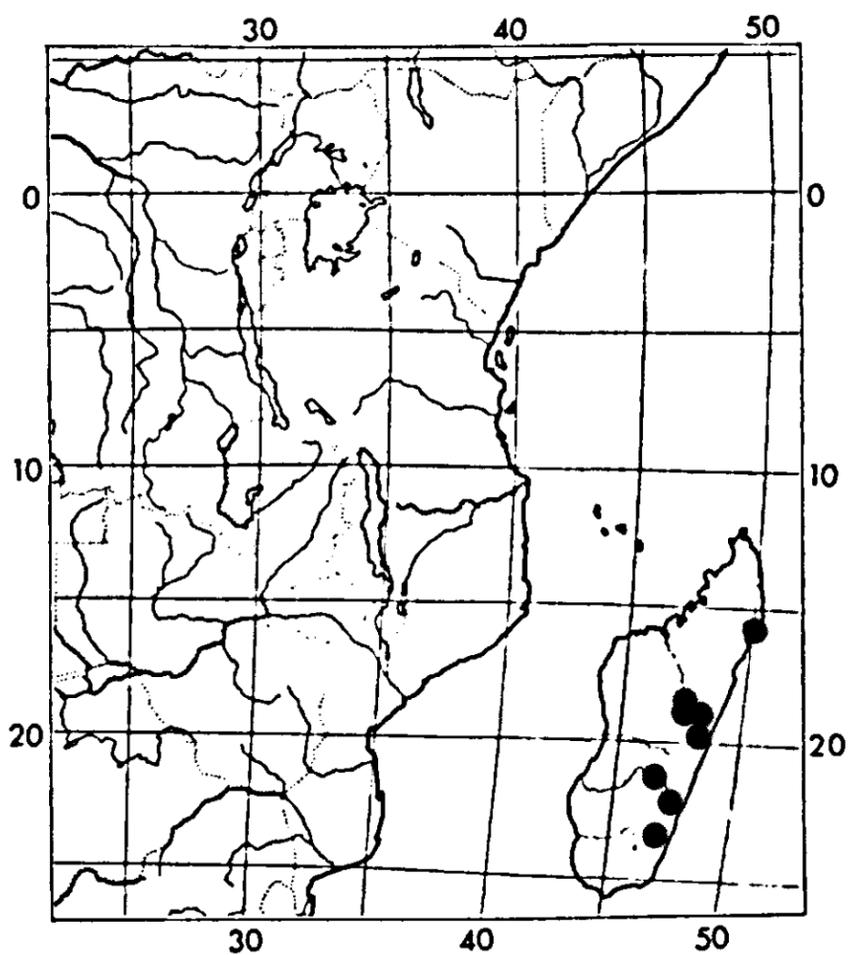
Specimens examined:

Madagascar. Ivohibé-Bara, forêt de Marovahy, *Armand 22* (in *herbier d'Alleizette*) (P); near Ivohibé, *Armand s.n.* (P); Perinet, *Bosser 2081* (P); Mandraka, *Capuron 662* (P); sin. loc., *Chapelier s.n.* (MPU, P, paratypus); sin. loc., *Cours 825* (P); Savoaka, *Dequaire 28008* (P); Perinet, *Descoings 836* (P); *1099* (P, WAG); Invohimantra forest, *Forsyth Major 131* (K); W. of Ivohibé, chaîne du Vohibory, *Humbert 3141* (BM, G, K, P, PRE); Bassin de la Manampanihy, col de Fitana, *Humbert 6061 bis* (P); Andrambovato, *Humbert & Capuron 28449* (P); sin. loc., *Lastelle s.n.* (P, type); Masoala, *Perrier de la Bâthie 6220* (P); bassin du Matilana, Rienana R., *Perrier de la Bâthie 6232* (P); between Imerina Mt. and Anjorobé Mt., *Perrier de la Bâthie 14956* (P); bassin du Mangoro, *Perrier de la Bâthie 18173* (P); near Ivohibé, Lantara valley, *Service Forestier 1456* (P).

Notes. *D. chlorinum* is one of the few Madagascar species with bilobed petals. the others being *D. madagascariense* Poir. and *D. multiflorum* (Tul.) Desc. which are closely related to one another. From these species *D. chlorinum* can easily be distinguished by its reflexed sepals and very distinct upper part of the pedicel.

It is not clear to which species *D. chlorinum* is most closely related, but it may be the continental *D. parvifolium* Engl.

DESCOINGS (1960: 78) quoted the specimen collected by LASTELLE as holotype. This is not correct, as TULASNE's original publication mentions 2 specimens, one collected by LASTELLE, another collected by CHAPELIER. The first one has been designated lectotype.



MAP 2. *D. chlorinum*

D. choristilum Engler, 1912-a: 570, nomen; 1912-b: 440, t. 49; De Wildeman, 1919: B23; Hauman, 1958-a: 325; Breteler, 1973: XVI; Punt, 1975: 16 (as *D. costatum* Breteler), 22 (as *D. choristilum* Engler).

Type: Zaïre, Aruwimi, Yambuya, *Mildbraed 3300* (holotype: B†; lectotype: BM).

D. mortehanii De Wildeman, 1919: B52; Hauman, 1958-a: 326. Type: Zaïre, Dundusana, *Mortehan 1018* (holotype: BR).

Diagnostic characters. Liana, lianescent shrub, or shrub. Liana stems with deeply lobed xylem cylinder. Lenticels usually not very conspicuous, in rows or not. Branches with a dark brown to black bark. Leaves usually drying black. Inflorescences not or very shortly pedunculate, usually clearly branched, few- to many-flowered. Petals and stamens drying black. Ovary lanate, the style usually deeply 2–4-lobed.

Description. Large liana, lianescent shrub, or shrub: liana stems up to 11 cm in diam., with a deeply lobed xylem cylinder (see BRETILER, 1973: phot. 3–4): lenticels in 5 rows, at least on the orthotropic shoots, conspicuous or not. *Branches* with a dark-brown to black bark, glabrous or glabrescent, lenticels conspicuous or not. *Branchlets* densely pale-brown felty when young, glabrescent with age: lenticels, if present, usually not conspicuous. *Stipules* rather long persistent, narrowly triangular to subulate, 2–7(10) mm long, hairy as the branchlets. *Leaves*: petiole subterete, often grooved above, 3–11 (18) mm long, pale-brown felty, glabrescent with age: blade obovate-elliptic, sometimes narrowly so, 1.5–2.5(4) times as long as wide, (4)8–18(30) × (2)3–8(13) cm, obtuse-cuneate at base or often tapering to a rather narrow rounded, obtuse, obliquely cordate or subcordate base, usually acuminate at apex, the acumen up to 1(2.5) cm long: lateral nerves 5–9 on each side of the midrib: the nervation always prominent beneath and usually impressed above, sometimes the midrib and main lateral nerves raised above: usually pale-brown tomentose or floccose both sides when young, sometimes very early glabrescent, but mostly longer persistent beneath as well as on the midrib and main lateral nerves above: glands, when present, dispersed, inconspicuous, both sides, but more numerous beneath. *Inflorescences* usually sessile, if pedunculate the peduncle at most 0.5 cm long, usually clearly branched, tomentose, few- to many-flowered; bracts and bracteoles minute, appressed, subtriangular, up to 1 mm long, tomentose to tomentellous beneath, glabrous or nearly so above. *Pedicel* (0)1–3 mm long, tomentose to tomentellous, the upper part very short or absent. *Sepals* erect, spreading, or reflexed, free or slightly united at base, ovate-oblong or triangular, ca 1.5–3 × 1 mm, tomentose to tomentellous outside, inside less densely so to almost glabrous, obtuse to acute at apex. *Petals* white when fresh, black when dry, erect–spreading, (1.5)2.5–4 mm long, usually split for half their length or more (1–2.5 mm), glabrous or with a few

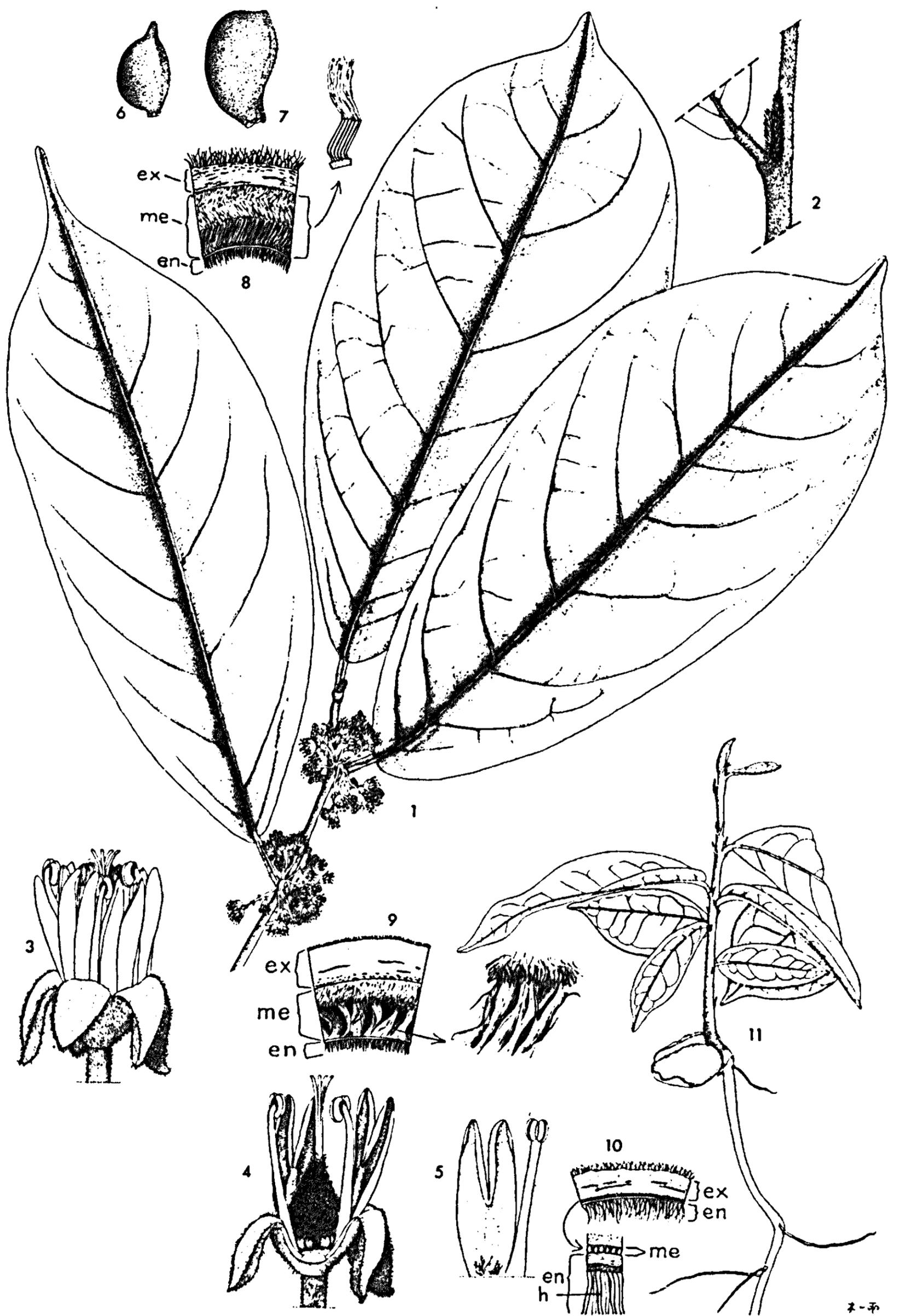
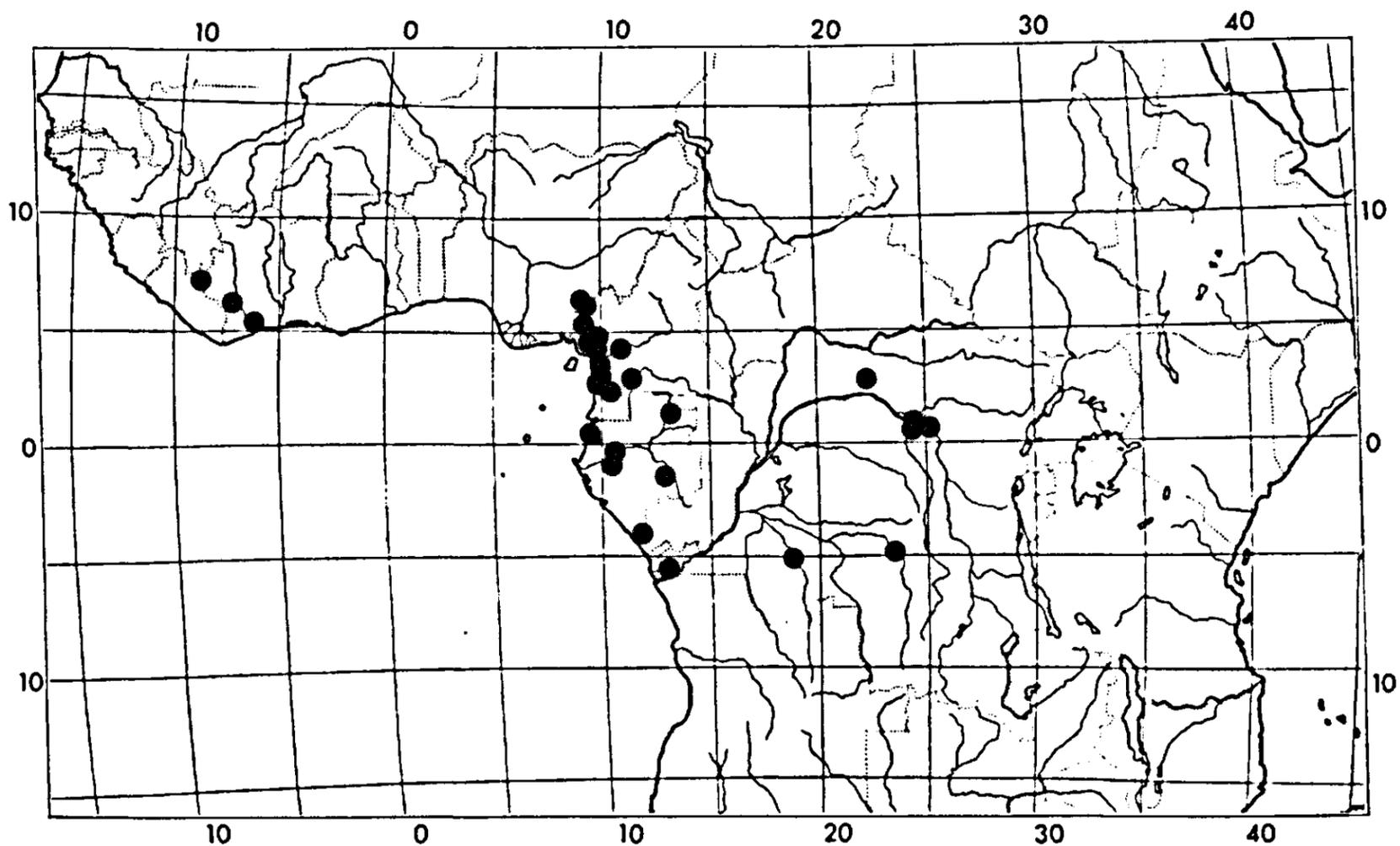


FIG. 3. *D. choristilum*: 1. flowering branch, $\frac{1}{2}\times$: 2. part of branchlet with leaf base and stipules, $1\times$: 3. flower, $6\times$: 4. flower part showing pistil, $6\times$: 5. petal and stamen, $6\times$: 6-7. 1-seeded fruits, $\frac{1}{2}\times$: 8. detail of fruitwall of mature, fresh fruit, $3\times$: 9. as 8, but from a dry, mature fruit: $3\times$: 10. as 8, but from an immature, dry fruit, $3\times$ (ex = exocarp: me = mesocarp: en = endocarp: h = hairs); 11. seedling, $\frac{1}{2}\times$. (1. Bos 3740: 2. Breteler 5755: 3-5. Leeuwenberg 5595: 6, 10. Bolela 624: 7. Bos 4542: 8. Bos 4971: 9. Hallé 3119: 11. Breteler 6228).



MAP 3. *D. choristilum*

hairs outside below split and/or with a few hairs near base inside, lobes concave. *Stamens* black when dry, erect or nearly so, (2)3–4(5) mm long, glabrous. *Staminodes* small, subquadrate to strongly bilobed, ca 0.5 × 0.5 mm or less, glabrous or with a few curly hairs. *Pistil* 2–4-merous, 2–4.5 mm long, densely lanate on ovary and lower part of style; style deeply lobed or even absent; lobes 1–3 mm long. *Fruits* 1–3-lobed, 1–3-seeded but usually 1-seeded: one-seeded fruits obovoid, 1.5–3 cm long, ca 1.5–2 cm in diam., orange at maturity: exocarp firm, 1–2 mm thick, densely villous to tomentose: mesocarp 2–3 mm thick, juicy, consisting of erect hairs (see drawing and notes) which are attached to the pergamentaceous endocarp, the latter densely brown-villous inside. *Seed* ellipsoid or nearly so, up to ca 20 × 10 mm: testa thin, brown.

Seedling with the first leaves alternate.

Distribution: West and Central Africa.

Ecology: Rain forest and semi-deciduous forest: alt. 0–1600 m.

Specimens examined:

Liberia. Tokadeh Mt., *Adam* 21409 (K).

Ivory Coast. Duékoué-Buyo, *Bamps* 2155 (BR); km 78 Sassandra-Gagnoa, *Breteler* 6136 (WAG); *Leeuwenberg* 3739 (WAG); 3790 (BR, K, P, WAG).

Nigeria. Ogoja prov., Sonkwale area, *Savory & Keay* FHI 25203 (K): Boshi Extension F.R., *van Meer* 1811 (WAG).

Cameroun. Kumba, near Bopo, Southern Bakundu, *Binuyo & Daramola* FHI 35574 (K, WAG); 15 km N. of Kribi, *Bos* 3740 (WAG); 8 km S. of Kribi, *Bos* 3977 (WAG); 15 km N. of Kribi, *Bos* 4542 (WAG); km 12 Kribi-Lolodorf, *Bos* 4637 (WAG); 13 km N. of Kribi, *Bos* 4740 (WAG); km 14 Kribi-Lolodorf, *Bos* 4971 (WAG); 9 km N. of Kribi, *Bos & Bre-*

teler 7198 (WAG); 26 km S. of Kribi, Campo Rd, *Bos & Breteler* 7218 (WAG); km 58 Edea-Kribi, *Leeuwenberg* 5521 (BR, K, P, WAG); 60 km S. of Edea, S. of Mboké, *Leeuwenberg* 5595 (BR, K, P, WAG); km 58 Douala-Loum, S. of Kompina, *Leeuwenberg* 8745 (WAG); Bakaka forest, 3 km E. of Eboné (km 11 Nkongsamba-Loum), *Leeuwenberg* 9313 (WAG); km 30 Kumba-Victoria, S. of Bombe, *Leeuwenberg* 10616 (WAG); 70 km S.S.W. of Bafia, border of Sanaga R., *Letouzey* 9806 (P, WAG); near Nyabessan, 60 km E. of Campo, *Letouzey* 10333 (P, WAG); 15 km S.S.W. of NGuti, *Letouzey* 13764 (P, WAG); between Sangmélina and Ebolowa, *Mildbraed* 5568 (HBG).

Gabon. 50 km S.E. of Lambaréné, *Breteler* 5755 (WAG); km 17 Moanda-Bakoumba, *Breteler* 6835 (WAG); near Libreville, *Courtet s.n.* (L); Ayem, S.W. of Ndjolé, *N. Hallé* 1594 (P); 10 km S.W. of Ndjolé, *N. Hallé* 2008 (P); Bélinga, *N. Hallé* 2795 (P, WAG); 3119 (P); *N. Hallé & Le Thomas* 436 (P); near Libreville, *Klaine* 2368 (P); 2732 (P); 3300 (BR, K, P).

Congo. Sounda region, near Massissia, *Sita* 1259 (P, WAG).

Zaire. Km 23 Kisangani-Bengamisa, *Bokdam* 4075 (WAG); Yangambi, *Bolela* 624 (BR); Kiyaka-Kwango, *Devred* 2207 (BR, WAG); Luki, *Devred* 3346 (BR, K, WAG); *Donis* 1998 (BR); Yangambi, *Donis* 3495 (BR, LISC); *Germain* 8573 (BR, LISC); Sangaie, *Gillardin* 533 (BR); Yangambi, *Louis* 2766 (BM, BR, C, K); 14428 (BR, COI, K, M, P, SRGH); 20 km N.E. of Yambao, *Louis* 15251 (BR, K); Aruwimi, near Jambuja, *Mildbraed* 3300 (BM, type); Dundusana, *Mortehan* 1018 (BR, type of *D. mortehanii*).

Cult. Netherlands, Wageningen, *Breteler* 6228 (WAG, seedling of *Bos* 4637).

Notes. HAUMAN (l.c.: 294) distinguished *D. mortehanii* from *D. choristilum* by some leaf characters and slightly longer stamens and pistils. The latter differences do not constitute a good specific character as they fall completely within the variability of *D. choristilum*. The difference in petiole-length mentioned by HAUMAN is contradicted by himself. *D. mortehanii* is keyed out by petioles 3–4 mm long, while the holotype has petioles up to 8 mm long and *D. choristilum* by petioles 8–10 mm long, but the material cited has petioles 4–18 mm long. As no good distinctive character could be observed, *D. mortehanii* is treated as a synonym of *D. choristilum*.

The juicy mesocarp as described (see fig. 3: 8), has only been observed in fully mature fruits. In fruits which, according to the field notes, were almost mature when collected, such a mesocarp was completely lacking, or only present as an initial layer (see fig. 3: 10) between exocarp and endocarp.

D. chrysobalanoides Hutch. & Dalz. = ***D. madagascariense*** Poir.

D. chrysobalanoides Hutchinson & Dalziel, 1928-b: 380: 1928-a: 324–325: Keay, 1958: 438: Breteler, 1973: XVIII. Type: Sierra Leone, sin. loc., *Scott Elliot s.n.* (holotype: K).

Note. The holotype and the paratypes (*Thomas* 6016, 6019, 6110, 6119, 6125, 6145) indeed represent a somewhat aberrant form of *D. madagascariense* in so far that the peduncles are mostly (not all!) partly adnate to the petiole. In *D. madagascariense*, however, the inflorescence is extremely variable, which has been described and illustrated before (BRETELER, 1973: 23, fig. 3) and it is shown again by other material from Sierra Leone, also collected by THOMAS: 1409 (K), 6273 (K), 6291 (K), 6328 (K). These specimens with the same type

of leaf, have the flowers mostly in glomerules. As the flowers itself do not show any difference from those of *D. madagascariense*, *D. chrysobalanoides* is reduced into synonymy of the former.

D. cicinnatum Engl. = **D. madagascariense** Poir.

D. cicinnatum Engler, 1912-a: 590: De Wildeman, 1919: B24: Engler & Krause, 1931: 8: Breteler, 1973: XVIII. Type: Cameroun, near Dodo, alt. 700–800 m, *Ledermann 2996* (holotype: B†: lectotype: BM).

Note. The fragment of the holotype conserved at BM has been designated lectotype. This fragment clearly shows that *D. cicinnatum* belongs in *D. madagascariense*. It represents more or less a form with an inflorescence type which is also seen in the later described *D. dundusanense* (see p. 63).

D. cinerascens Engl. = **D. pallidum** (Oliv.)Engl.

Note. ENGLER mentioned this name (1902: 85) in a text comparing the new species *D. liberiae* Engl. & Dinkl. with the following new species *D. cinereum*. It is evident, that, when using the name *D. cinerascens*, *D. cinereum* is meant. Using two names for the same species, occurred also with *D. ferrugineotomentosum* Engl. where the variant *D. rufotomentosum* has been used by ENGLER (see BRETELER, 1973: 55, 60).

D. cinereo-viride Engl. = **D. staudtii** Engl.

D. cinereo-viride Engler, 1912-a: 581: Pellegrin, 1913: 646: Engler, 1915: 847: De Wildeman, 1919: B24: Breteler, 1973: XX: Punt, 1975: 29. Type: Cameroun, Bipindi, *Zenker 2900* (holotype: B: isotypes: BM, BR, COI, E, G, GOET, K, L, M, P, W, WAG, WU, Z).

Note. By the few-flowered inflorescences (see BRETELER, 1973: 23) and by the leaves with a relatively prominent reticulum above, *Zenker 2900* is somewhat aberrant within *D. staudtii*. As rather few-flowered inflorescences may be observed in other specimens (e.g. *J. J. F. E. de Wilde 8490* (WAG)) as well, and the prominent reticulum seems to be due to the age of the leaves, no justification could be found to maintain *D. cinereo-viride* as a distinct taxon.

D. cinereum Engl. = **D. pallidum** (Oliv.)Engl.

D. cinereum Engler, 1902: 85: Engler, 1912-a: 574: Pellegrin, 1913: 645: De
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Wildeman, 1919: B24; Breteler, 1973: XIX; Punt, 1975: 15–18. Type: Cameroun, Yaoundé, *Zenker 745* (lectotype: WU; isotypes: BREM, K).

Note. *D. cinereum* was based by ENGLER on two numbers: *Zenker 745* from Cameroun and *Millen 212* from Nigeria. From the original specimens lost at Berlin two duplicates of *Zenker 745* have been traced. These specimens although having small, shortly stipitate inflorescences, fit well within the variability of *D. pallidum*.

D. cinnamomeum Haum. = **D. fructuosum** Hiern

For details see under *D. fructuosum*, p. 77.

D. claessensii De Wild. = **D. acuminatum** De Wild.

For details see under *D. acuminatum* (BRETILER, 1973: 43).

D. cleistanthoides Hiern, nom. nud.

Note. This MS. name has been found on *Welwitsch 461* in BM. This specimen does not belong in the *Dichapetalaceae*.

D. confertum Anonym., nom.nud. = **D. madagascariense** Poir.

Note. This name without author has been found on *Bates 1424* in the British Museum, Natural History. It is identified as *D. madagascariense*.

D. congoense Engl. & Ruhl.

Fig. 4–5 Map 4

D. congoense Engler & Ruhland, 1902: 78: Th. & H. Durand, 1909: 94: Engler, 1912-a: 567; De Wildeman, 1919: B24; Exell & Mendonça, 1951-b: 324; Hauman, 1958-a: 303: Breteler, 1973: 16, 18, 33. XVI: Punt, 1975: 29.

Type: Zaïre, Bingila, *Dupuis s.n.* (holotype: BR).

D. mekametane Engler, 1912-a: 589; De Wildeman, 1919: B50. Type: Aequatorial Guinea, Campo area, near Bebao, *Tessmann 795* (holotype: B†: lectotype: K: isotype: BM).

Diagnostic characters. Liana or lianescent shrub with a pale yellowish to silverish bark with distinct dark-brown to black lenticels. Woodcylinder divided by intruding phloem. Stipules entire, narrowly triangular to subulate.

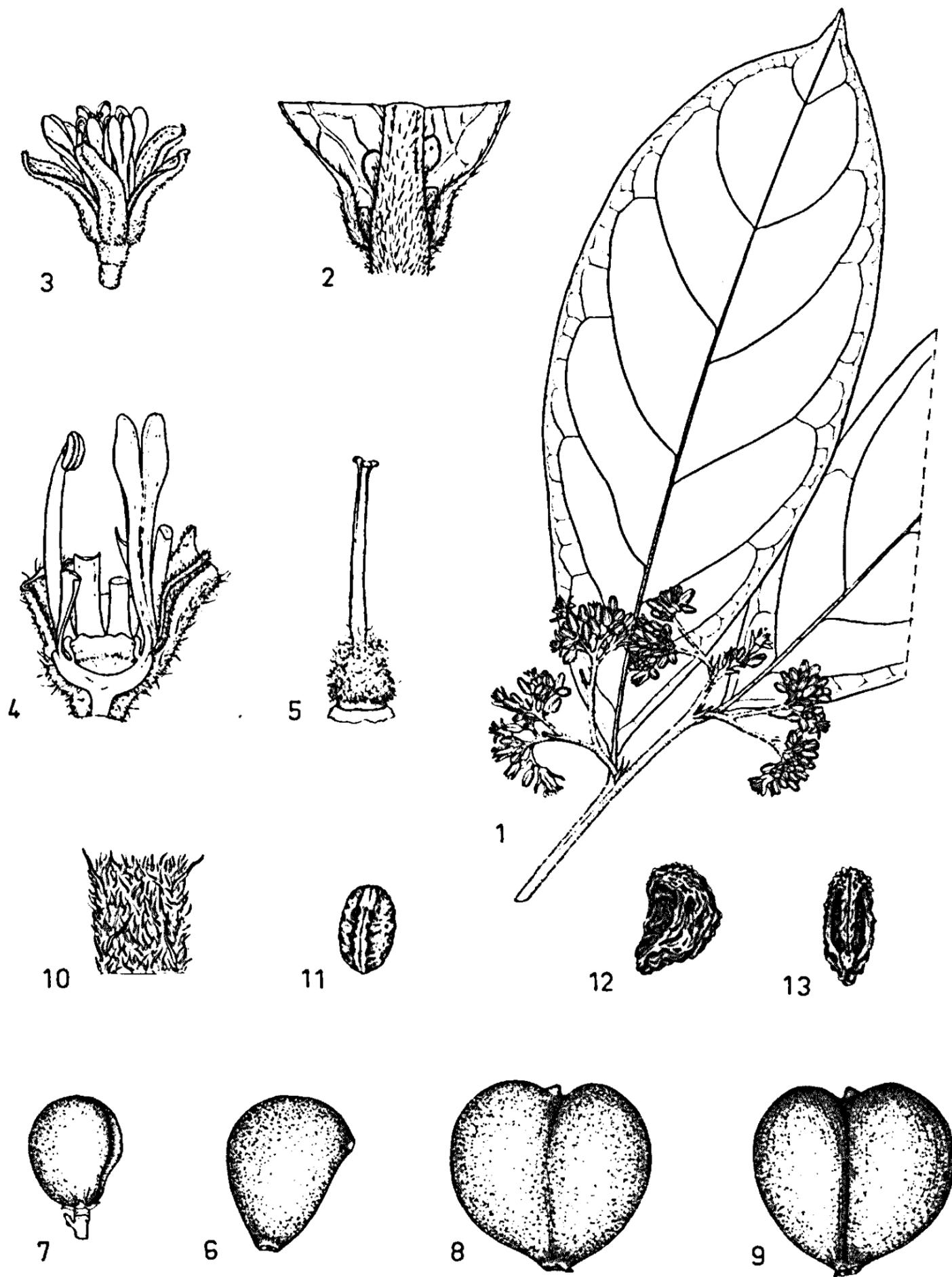


FIG. 4. *D. congoense*: 1. flowering branchlet, $\frac{1}{2}\times$; 2. leaf base below showing revolute margins and glands, $3\times$; 3. flower, $3\times$; 4. flower, part of perianth and stamens and pistil removed, $6\times$; 5. pistil, $6\times$; 6-7. 1-seeded fruit, $\frac{1}{2}\times$; 8-9. 2-seeded fruit, $\frac{1}{2}\times$; 10. detail of fruit indumentum, $12\times$; 11-13. pyrenes, $\frac{1}{2}\times$. (1-2. *Breteler* 2180; 3-5. *Breteler* 1257; 6, 8-9, 12-13. *Bos* 5029; 7, 10-11. *Louis* 6721).

up to ca 7 mm long. Leaves obovate to elliptic, usually shiny above, (7)13-18(25) \times (3)5-9(11) cm, at extreme base with an abruptly, strongly revolute margin, acuminate, glabrous or nearly so. Inflorescences rather loose, distinctly pedunculate, 2-3 times distinctly branched, up to 100-flowered, peduncle free from the petiole. Sepals, petals, stamens, and pistil subequal in length. Fruits 1-3-lobed, 1-3-seeded, rather smooth, tomentellous to tomentose, up to 4 cm long. Seedling with the first pair of leaves opposite.

Description. Large liana, lianescent shrub, shrub, or (?) tree. Main stem up to 5 cm in diam.; bark pale yellowish-green to silverish-green, becoming shallowly longitudinally fissured with age, and finally peeling off with thin, small flakes: lenticels dark-brown to black, very distinct, at first usually appearing as a short transverse line, later on usually x-shaped; the woodcylinder strongly lobed by intruding phloem, the phloem white when fresh, rapidly turning brown when exposed. *Branches* lenticellate, glabrous or glabrescent. *Branchlets* yellowish to greyish appressed-puberulous, tomentellous, or tomentose, glabrescent with age. *Stipules* early caducous or not, narrowly triangular to subulate, 2–6(8) mm long, puberulous to tomentose. *Leaves*: petiole semi-terete, (2)4–8(12) mm long, puberulous to tomentose, glabrescent or not; blade papery, usually shiny above, obovate to elliptic, (7)13–18(25) × (3)5–9(11) cm, (1)2–2.5(3) times as long as wide, rounded to cuneate sometimes obtuse at base, the margin at the extreme base usually strongly and abruptly revolute, acuminate at apex, the acumen up to 1.5 cm long, usually acute, when obtuse often mucronate: when young appressed-hairy both sides on midrib and, to a lesser extent, on main lateral nerves (when very young sometimes also between the nerves), soon glabrescent: the nervation usually slightly prominent above, more strongly so below, main lateral nerves 5–8(9) on each side of the midrib: glands usually below only, dispersed or usually mainly alongside the midrib with concentrations near base and on the acumen. *In-florescences* rather loose, usually distinctly pedunculate, at least 2–3 times distinctly branched, up to ca 100-flowered, greyish to yellowish tomentellous to tomentose: peduncle (0)4–12(16) mm long: bracts and bracteoles rather small, narrowly triangular to subulate, up to 3 mm long. *Pedicel* up to ca 6 mm long, but usually much shorter, the lower part 5 mm long at most, the upper part up to 1 mm long, tomentellous. *Sepals* erect, spreading, curved, or sub-reflexed, free or very shortly united at base, oblong to obovate, often narrowly so, (3.5)4–6 × 1–1.5(2) mm, obtuse to acute often apiculate at apex, sometimes distinctly 3-nerved, densely tomentellous both sides. *Petals* erect or nearly so, free or very shortly adnate to filaments at base, spatulate in outline, as long as the sepals or nearly so, (3.5)4–6.5 mm long, 1–1.5 mm split, usually glabrous, sometimes with a few hairs outside or on the margin, the lobes concave. *Stamens* as long as the petals or slightly shorter, (3.5)4–6.5 mm long, glabrous: anthers ca 0.7 mm long, with a prominent connective. *Staminodes* united, forming a lobulate or undulate glabrous ring around the base of the ovary, at most 0.5 mm high. *Pistil* 3-merous, usually slightly longer than the petals, (3.5)4.5–6(7) mm long: style glabrous or villous at base, shortly 3-lobed at top: ovary depressed subglobose or ovoid, densely villous. *Fruits* 1–3-lobed, 1–3-seeded, tomentellous to tomentose, orange at maturity, smooth when fresh: 1-seeded fruits: obliquely ellipsoid, slightly laterally compressed, 2–4 cm long, 1–2.5 cm broad, 1–2.2 cm thick: exocarp rather firm, mealy, 1–3 mm thick: mesocarp yellow, juicy, somewhat fibrous, sweet, sticking to endocarp, 1–2 mm thick: endocarp usually curved, irregularly grooved-ridged, pale brown, the wall bony, 1–2 mm thick, smooth inside. *Seed* subellipsoid, usually



PHOT. 1. *D. congoense*: fruiting branch. (*Bos & Breteler 7317*; phot. F. J. BRETELER).

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curved, up to 2 cm long and ca 1 cm in diam., slightly laterally compressed: testa firm, brown-black, somewhat finely grooved, dull or glossy, with a ca 1 cm long hilum.

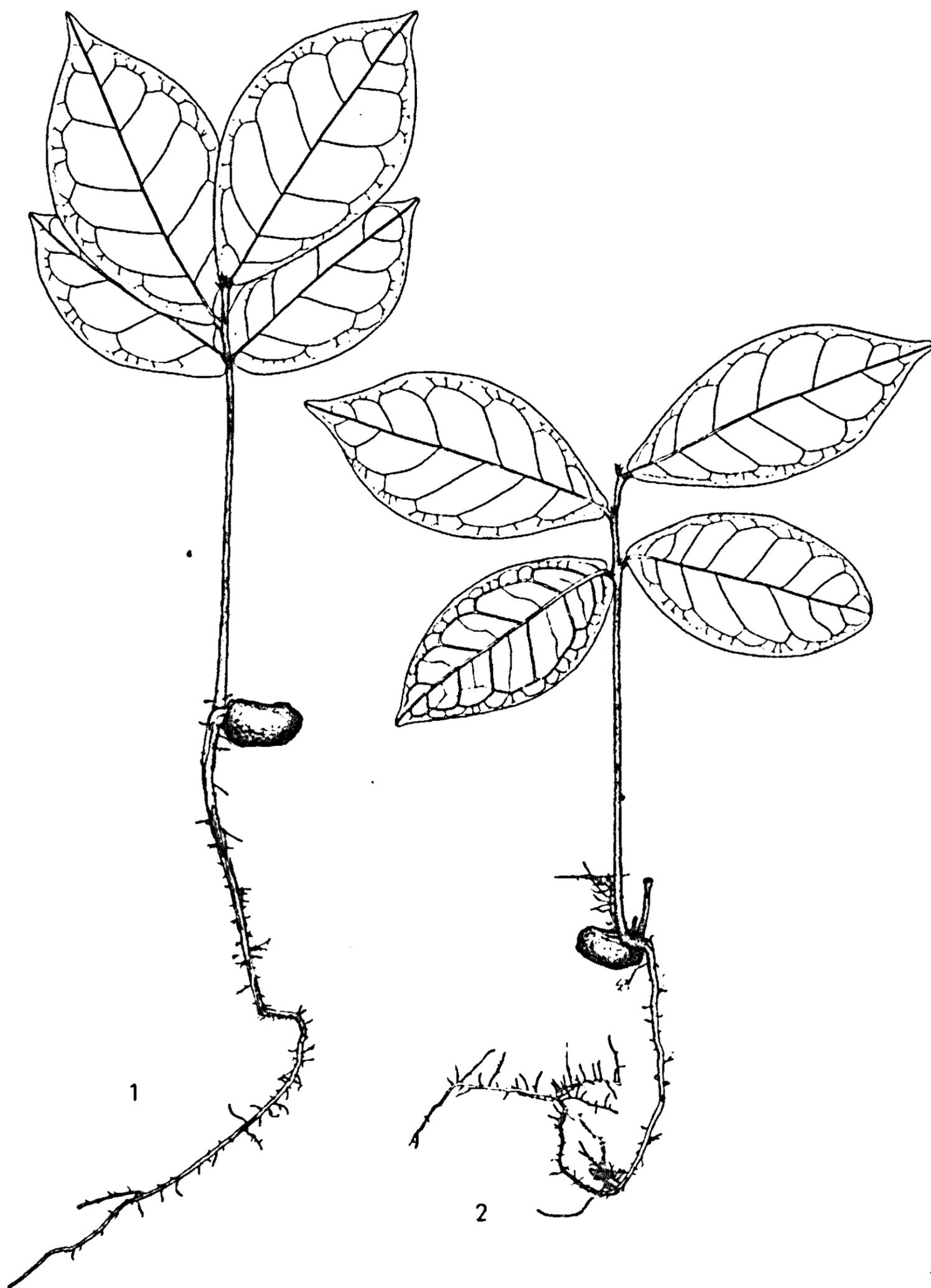


FIG. 5. *D. congoense*: 1. seedling with the first two leaves opposite, $\frac{1}{2} \times$; 2. seedling with the first two leaves alternate, the died epicotyl visible at the right of the leafy shoot, $\frac{1}{2} \times$ (see BRETELER, 1973: 29). (1-2. Breteler 7007).

Seedling: taproot firm, silverish: epicotyle 7–12 cm long, silverish, usually sparsely subappressed-hairy: first pair of leaves opposite, elliptic to obovate, ca 6–9 × 3–4 cm, with a cordate to subcordate base: subsequent leaves with an obtuse to rounded base, gradually becoming larger.

Distribution: Cameroun, Equatorial Guinea, Gabon, Congo, Zaïre, Angola.

Ecology: Rain forest.

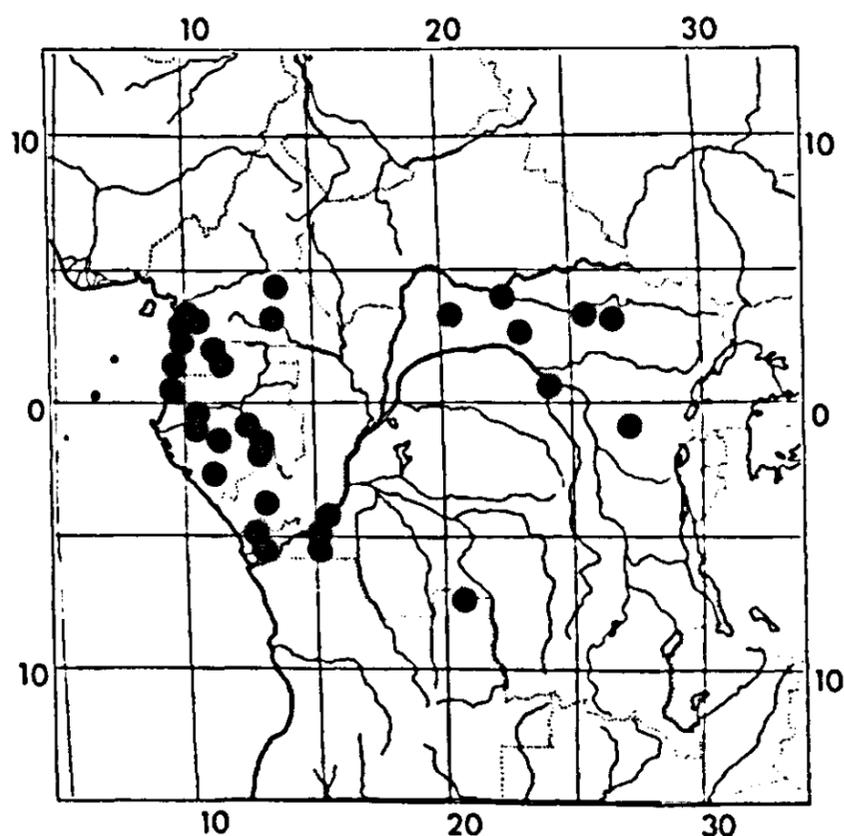
Specimens examined:

Cameroun. 2 km S. of Kribi, *Bos & Breteler 3047* (WAG); *Bos 4487* (WAG); ca 11 km N. of Kribi, *Bos 4739* (WAG); 2 km S. of Kribi, *Bos 5029* (WAG); 5258 (WAG); 5396 (WAG); 6 km N. of Kribi, *Bos 5607* (WAG); 6 km S. of Kribi, *Bos 5942* (WAG); 2 km S. of Kribi, *Bos 5963* (WAG); E. of Kribi, *Bos 6159* (WAG); km 60 Kribi-Edea, *Bos 6328* (WAG); Kribi, *Bos 6437* (WAG); 9 km N. of Kribi, *Bos 6842* (WAG); 2 km S. of Kribi, *Bos & Breteler 7196* (WAG); km 40 Kribi-Campo, *Bos & Breteler 7277* (WAG); km 45 Kribi-Campo, *Bos & Breteler 7317* (WAG); Lomié, *Breteler 1257* (BR, K, P, WAG); km 9 Bertoua-Doumé, *Breteler 2180* (BR, FI, K, LISC, M, P, WAG); 27 km S.W. of Bertoua, *Breteler 2965* (BR, FI, K, LISC, M, P, WAG); 4 km S. of Kribi, *W. de Wilde c.s. 2891 A* (WAG); *2891 B* (WAG); 3 km S. of Kribi, *Farron 7160* (P); 10 km S.S.E. of Campo, *Letouzey 9176* (P, WAG); Bipindi, *Zenker s.n.* (LD).

Equatorial Guinea. Benito R., *Guiral s.n.* (P); Campo area, Bebao, *Tessmann 795* (BM, K, type of *D. mekametane*).

Gabon. 50 km S.E. of Lambaréné, *Breteler 5785* (BM, WAG); km 9 Moanda-Franceville, *Breteler 6301* (WAG); km 33 Moanda-Bakoumba, *Breteler 6747* (WAG); 60 km S.W. of Moanda, *Breteler 6850* (WAG); 10 km S.W. of Ndjolé, *N. Hallé 1693* (P, WAG); 1938 (P); 1951 (P); 2011 (P, WAG); Libreville, *Klaine 1851* (P, WAG); Nyanga region, Ndenga, *Le Testu 1753* (BM, E, K, P, WAG, Z); Mobila Mwirri, *Le Testu 2039* (BM, K, P, WAG); Pounga, *Le Testu 5248* (BM, P, WAG); Cwagnya, *Le Testu 6416* (BM, BR, P, WAG); Lastoursville, *Le Testu 7217* (BM, BR, P, WAG); Lastoursville region, Ivélé, *Le Testu 8792* (BM, BR, P, WAG); Oyem, *Le Testu 9302* (BM, P, WAG); 9524 (BM, P).

Congo. Mudongo R., 25 km W. of Sibiti, *Farron 4411* (P, WAG); 4414 (P, WAG).



MAP 4. *D. congoense*

Zaire. Kivu, Walikale-Lubutu, *Bequaert* 6628 (BR, WAG); Tshela, NKai-Mbaku, *Breyne* 2660 (BR); 2662 (BR); Bondisa-Bumba, *Claessens* 603 (BR, WAG); Kinshasa, *Devred* 997 (BR, SRGH); Bas-Uele, *De Wulf* 144 (BR); Bingila, *Dupuis s.n.* (BM, BR, type); Bongabo, *Evrard* 1120 (BR); Kumvula Rd, *Flamigni* 10094 (BR); Bambesa, *Gérard* 435 (BR); 2367 (BR, K); 5080 (BR, K); 5522 (BR, K); Madimba, *Germain* 2080 (BR, M); Gimbi, *Laurent* 363 (BR); Mobwasa, *Lemaire* 96 (BR); Yangambi, *Louis* 307 (BM, BR, EA, FI, K, P); 2431 (BM, BR, K); 5844 (BM, BR, EA, K); 6329 (BM, BR, EA, FI, K, P, PRE); 6372 (BM, BR, COI, EA, K, P); 6721 (BM, BR, COI, EA, FI, K, P); 7268 (BM, BR, K); 12736 (BR); 14491 (BM, BR, EA, K, P); 15193 (BM, BR, EA, K, P); Kimwenza, *Pauwels* 3403 (BR); Gimbi, *Toussaint* 557 (BR); Temvo, *Vermoesen* 1874 (BR, LISC, LISU).

Angola. Dundo, near Luachimo R., *Gossweiler* 13789 (B, BM, K, P); Cossa, near Luembe R., *Gossweiler* 14073 (B, BM, COI, K, P).

Cult. (seedlings). Netherlands, Wageningen, *Breteler* 6229 (WAG); 6234 (WAG); 7007 (WAG); *de Bruijn* 1959 (WAG).

Notes. *D. congoense* can easily be distinguished by its typical leafbase (see fig. 4: 2), which is further only seen in *D. integripetalum* Engl. These two species can easily be separated by the indumentum of the ovary: like cotton-wool in *D. congoense*, short erect-hairy in *D. integripetalum*. *D. congoense* is most closely related to *D. unguiculatum* Engl. which has usually much smaller leaves, petals and stamens distinctly longer than the sepals, and smaller fruits.

In ENGLER's artificial classification (1912-a) *D. congoense* and *D. mekametane* are placed in different sections, i.e. in section *Eudichapetalum* and in section *Brachystephanium* respectively. Comparison of the original descriptions with the types and other available material, however, confirms that both are conspecific.

D. mekametane was not mentioned by PELLEGRIN (1913), although it has been described from a 'pays limitrophe' (see PELLEGRIN's note, p. 583).

D. conrauanum Engl. & Ruhl. = **D. heudelotii** (Planch. ex Oliv.) Baill.

D. conrauanum Engler & Ruhland, 1902: 88; Engler, 1912-a: 570; De Wildeman, 1919: B24; Breteler, 1973: XVII. Type: Cameroun, Banyang valley, *Conrau* 106 (holotype: B†; lectotype: BM).

Note. The fragment of the holotype conserved at BM shows that *D. conrauanum* has indeed abruptly acuminate leaves. This character, however, does not justify its separation from the variable *D. heudelotii*.

D. contractum Engl. = **D. staudtii** Engl.

D. contractum Engler, 1912-a: 585, nomen: 1912-b: 442; De Wildeman, 1919: B24; Hauman, 1958-a: 318; Breteler, 1973: XX; Punt, 1975: 29. Type: Zaire, between Irumu and Mawambi, *Mildbraed* 2951 (holotype: B†; lectotype: BM).

Note. The duplicate of *Mildbraed 2951* at BM, although of poor quality, has been designated lectotype. It is positively identified as *D. staudtii* and closely resembles other specimens from N.E. and E. Zaïre e.g. *Bequaert 2380* (BR) and *Bequaert 3093* (BR).

D. cordifolium Hutch. & Dalz. = **D. reticulatum** Engl.

D. cordifolium Hutchinson & Dalziel, 1928-a: 324; 1928-b: 380; Keay, 1958: 438; Breteler, 1973: XIX. Type: Southern Nigeria, Akure, *Foster 192* (holotype: K).

Note. KEAY (l.c.) reduced *D. cordifolium* into synonymy of *D. reticulatum*. His decision is fully supported.

D. corradii Chiov. = **Tapura fischeri** Engl.

D. corradii Chiovenda, 1952: 232; Cufodontis, 1956: 412. Type: Ethiopia, Omo valley, Murle Lake, *Corradi 8400* (lectotype: FI; isotype: WAG).

Note. It is beyond doubt that the 10 syntypes mentioned by CHIOVENDA all represent *Tapura fischeri*. *Corradi 8400*, representing the best material, was chosen as lectotype.

D. corrugatum Exell = **D. unguiculatum** Engl.

D. corrugatum Exell, 1927: 67; Exell & Mendonça, 1951-b: 324; Breteler, 1973: 18, XVI; Punt, 1975: 29. Type: Angola, Mayumbe, Pango Munga, *Gossweiler 6104* (holotype: BM; isotypes: BR, COI, K, LISU).

Notes. In the provisional key (BRETELER, 1973: VIII) *D. corrugatum* was distinguished from *D. unguiculatum* by differences in indumentum of the leaves. Woodsamples from Gabon (*Breteler 6434, 6469, 6904*) showing marked differences (BRETELER, 1973: 18, phot. 12–13) further stressed the segregation of the two species. The herbarium vouchers accompanying the Gabonese woodsamples in question are sterile, and were, on account of strong similarities in indumentum, considered to be conspecific with flowering specimens of *D. corrugatum* (*Gossweiler 6104, Bouquet 507* (P), *Sita 1879* (WAG)).

However, a careful investigation of the variation of leaf indumentum in *D. unguiculatum* has revealed no grounds for separation of the flowering *D. corrugatum* specimens, and, moreover, flower characters to separate them are wanting as well. In other words, both species are conspecific.

In spite of this, the differences shown in the woodsamples mentioned above

(characters of the bark and pattern on transverse section) remain impressive and they are, together with their sterile vouchers, kept separate until complete material will be available. They may well represent a new species.

The young fruits of *Gossweiler 6104* are a little corrugate, a character used by EXELL for the specific epithet. Slightly corrugated fruits are often seen in *D. unguiculatum* and it proves to be unuseful in specific segregation.

The flowering specimens cited above have larger anthers than generally seen in *D. unguiculatum*. Some intermediates, however, are seen in *Zenker 539* from Cameroun and *Chevalier 26943* from Gabon.

D. costatum Bret. ex Punt = *D. choristilum* Engl.

D. costatum Breteler ex Punt, 1975: 4, 6, nom.nud.

Note. This name was used by this author for some *D. choristilum* specimens with prominent midribs. This character, however, proved to be very variable in *D. choristilum* and cannot serve for taxonomic distinction.

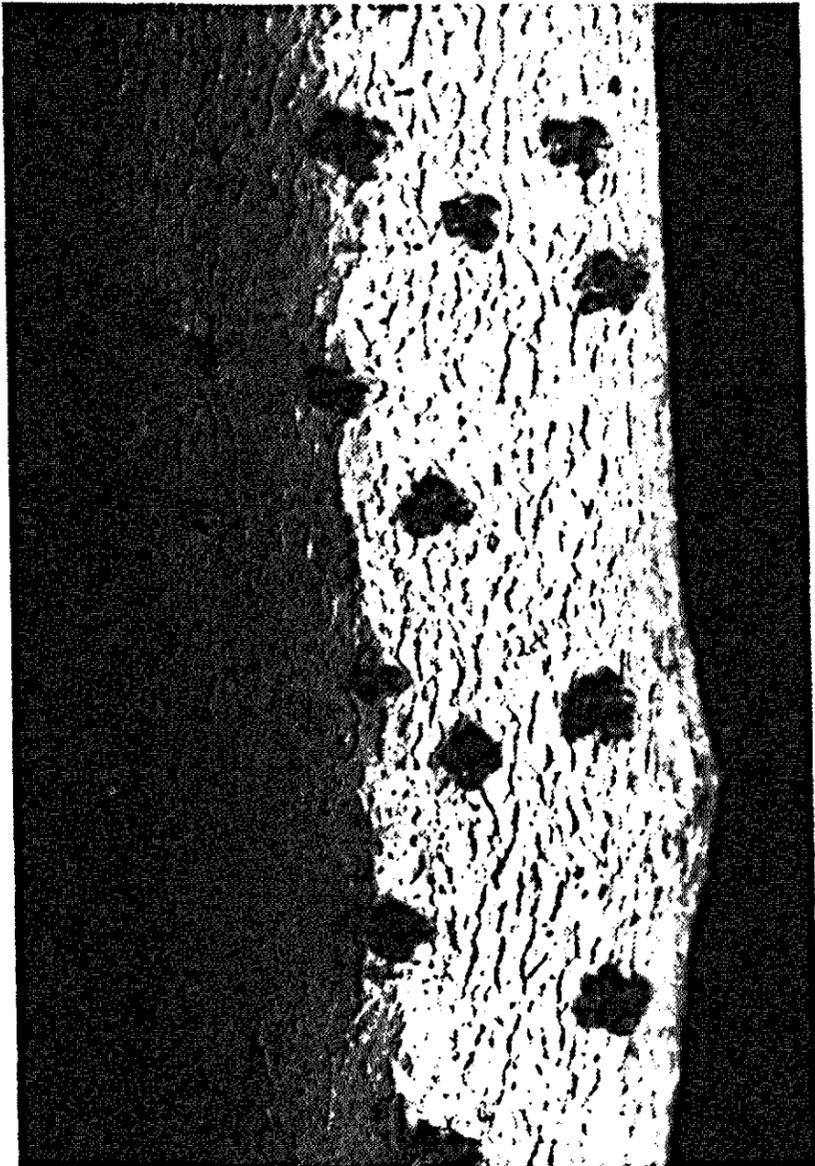
***D. crassifolium* Chod.**

Fig. 6 Map 5

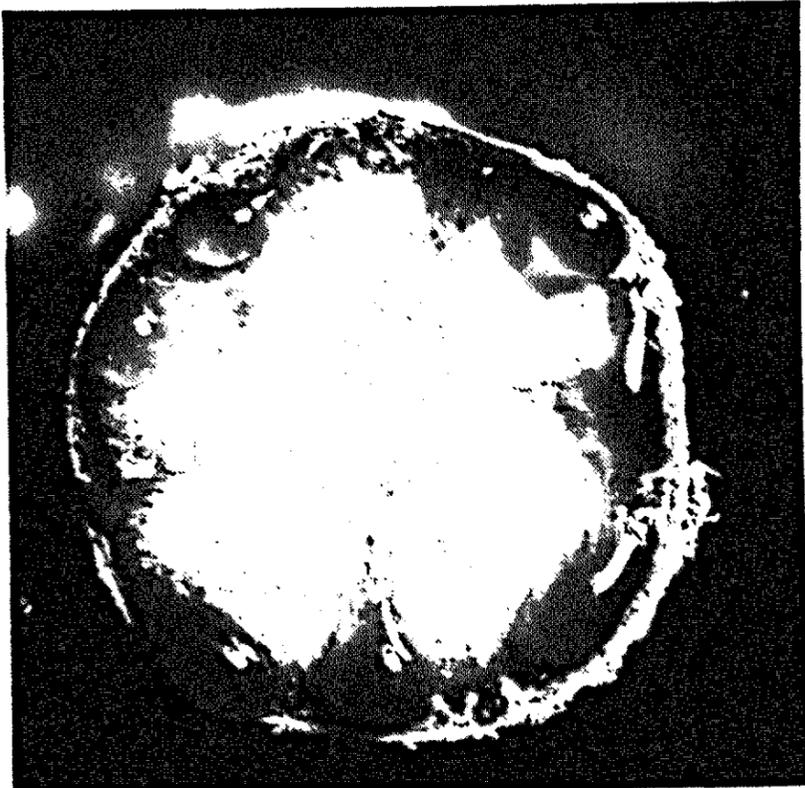
For literature, synonyms, and typification see under the varieties.

Diagnostic characters. Liana, lianescent shrub, or shrub. When freshly cut stem and branches exude a reddish, sour, sticky slime, turning dark brown to black in drying. Leaves usually coriaceous, beneath often with pilose domatia in the axils of the main lateral nerves. Inflorescences shortly peduncled, usually once distinctly branched, the peduncle free from the petiole. Petals, stamens, and pistil subequal in length: the petals entire or emarginate at apex. Fruit velutinous-tomentose, when more than 1-seeded distinctly lobed.

Description. Large liana up to at least 40 m long and 5 cm in diam. at base, reaching the crown of tall trees, lianescent shrub, or shrub. Procumbent parts of stem may root. *Stem* and *branches* usually with prominent rather large lenticels, those on the orthotropic shoots sometimes in distinct rows: usually shallowly grooved, with greyish or brownish outer bark. Inner bark and intruding phloem when freshly cut exuding a reddish, sour, sticky slime turning dark-brown to black in drying. Intraxylary phloem absent. *Branchlets* rusty or greyish appressed-puberulous or appressed-pubescent, soon glabrescent or not. *Stipules* usually soon deciduous, subulate to narrowly oblong-triangular, 1–5 mm long, appressed-pubescent to puberulous. *Leaves*: petiole semi-terete, often grooved or canaliculate above, (1)3–10(16) mm long, appressed-pubescent to puberulous, soon glabrescent or not: blade usually coriaceous, elliptic to obovate, sometimes narrowly so, (4)8–14(22) × (1)4–8(11) cm, cuneate to



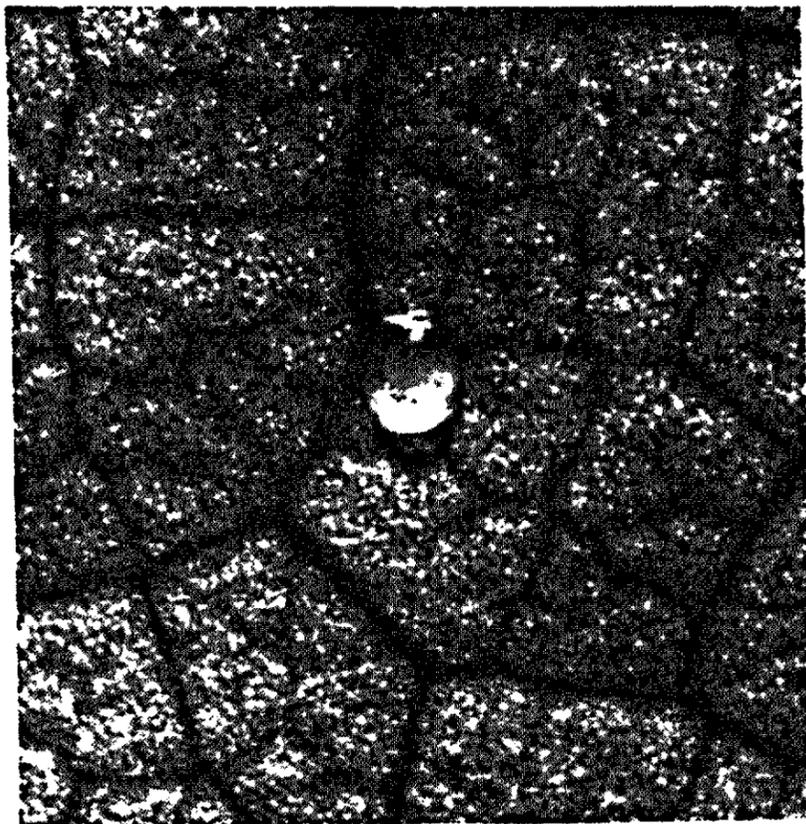
PHOT. 2. *D. crassifolium* var. *crassifolium*: stem with lenticels. (*Breteler 7518*; diam. 3 cm; phot. J. W. MUGGE).



PHOT. 3. *D. crassifolium* var. *crassifolium*: cross section of stem showing exudate. (*Breteler 7518*; diam. 3 cm; phot. J. W. MUGGE).



PHOT. 4. *D. crassifolium* var. *crassifolium*: leaf seen from above showing dark spots, which correspond with glands on lower surface. (*Breteler 7518*; phot. H. C. D. DE WIT).

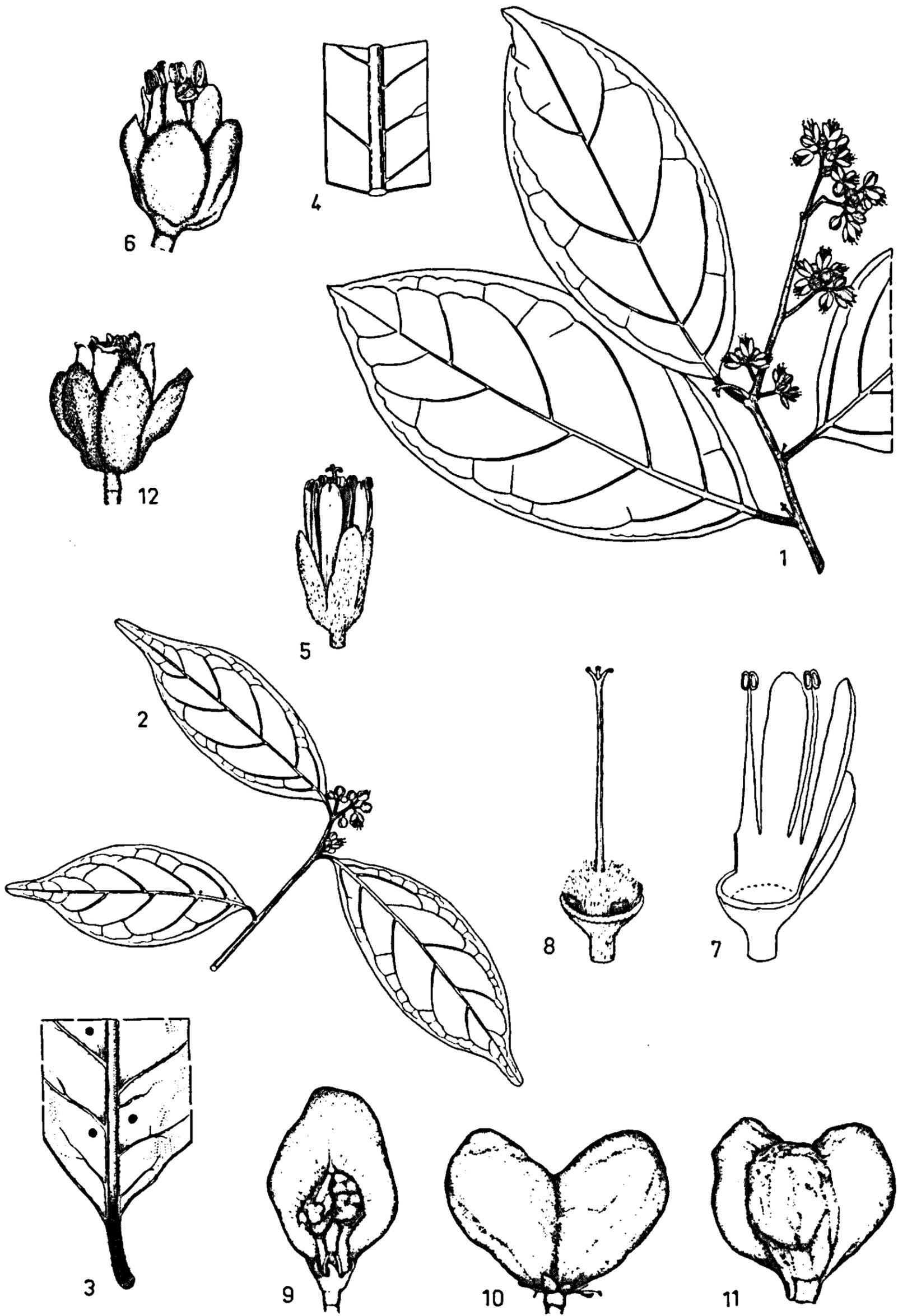


PHOT. 5. *D. crassifolium* var. *crassifolium*: gland with drop of nectar on lower leaf surface. (*Breteler 7518*; phot. H. C. D. DE WIT).

truncate at base, the leaf margin often decurrent into the petiole, usually with an obtuse, sometimes acutish or mucronate acumen of 0.5–1(2) cm long: midrib flat or raised above, more prominent beneath, with (3)4–6(7) main lateral nerves on each side: when young appressed-puberulous or pubescent on midrib and main lateral nerves both sides, usually soon glabrescent: in the axils of the main lateral nerves beneath often pilose domatia present: glands often conspicuous in fresh young leaves, rather inconspicuous in dried leaves, beneath only or at least more numerous beneath, rather dispersed, sometimes more concentrated on or just below the acumen and then the acumen usually irregular in shape. *Inflorescences* usually pedunculate, up to 50-flowered, up to 4 times branched usually once distinctly so, when indistinctly branched resembling a stalked subglobose head or a glomerule, sometimes more or less densely grouped on a short leafless axillary shoot, appressed-puberulous to tomentellous: peduncle free from the petiole, (0)2–7(12) mm long: bracts and bracteoles minute, ca deltoid, less than 1 mm long, appressed-puberulous to tomentellous. *Pedicel* up to 5 mm long, densely appressed-puberulous, the upper part up to 1 mm long. *Calyx* obtuse-truncate at base. *Sepals* erect or nearly so, shortly united at base, flat or concave, often rather thick, from ovate to obovate or oblong, 2.5–4(5.5) × 1–2(3) mm, acutish to obtuse at top, densely appressed-puberulous to tomentellous outside, inside often partly or less densely so. *Petals* erect, entire or emarginate at apex, narrowly oblong-obovate or spatulate, 2.5–6 mm long, ca 1 mm wide, at base for 0.5–2.5 mm adnate to the filaments, glabrous or with a few hairs outside and/or inside, the margin sometimes ciliate above the adnation. *Stamens* 2.5–6 mm long, glabrous or with a few hairs on the filaments: anthers up to 1 mm long with a prominent connective. *Staminodes* oblong, subquadrate, or transversely oblong, up to 0.5 × 1 mm, glabrous or with a few hairs. *Pistil* 3-merous, 2.5–6(7) mm long: ovary densely covered with short stiff hairs: style glabrous or with a few hairs in the lower part, shortly 3-lobed at top. *Fruits* (known only from var. *crassifolium*) 1–3-lobed, 1–3-seeded: 1-seeded fruits: ellipsoid to obovoid or subglobose, usually laterally compressed, 15–25 mm long, 10–20 mm broad, 10–18 mm thick, obtuse at apex (a small apiculum may be present laterally), smooth to slightly bullate (wrinkled or rather strongly bullate when dry), densely velutinous-tomentose, orange at maturity: when 2–3-seeded usually deeply cleft apically and laterally, when 1-seeded the aborted cells usually present as small lumps: exocarp firm, 1–2 mm thick: mesocarp juicy, somewhat fibrous, adhering to

FIG. 6. *D. crassifolium* var. *crassifolium*: 1. large-leaved flowering branchlet, inflorescences grouped on a leafless axillary shoot, $\frac{1}{2}\times$: 2. small-leaved flowering branchlet, $\frac{1}{2}\times$: 3. leaf base below, showing glands and hairy domatia, $1\frac{1}{2}\times$: 4. part of leaf showing prominent midrib, $1\frac{1}{2}\times$: 5. flower, $3\times$: 6. flower with thick sepals, $3\times$: 7. part of flower showing adnation between petals and filaments, $6\times$: 8. pistil with staminodes, $6\times$: 9. 1-seeded fruit, with 2 lumps as remnants of the aborted cells, $1\times$: 10. 2-seeded fruit, $1\times$: 11. 3-seeded fruit, $1\times$. (1. Mildbraed 3802: 2–4, 7–8. Mildbraed (?) 2203; 5. Bequaert 2618; 6. Breteler 6967; 9. Germain 4967; 10. Sita 2850; 11. Pierlot 1027).

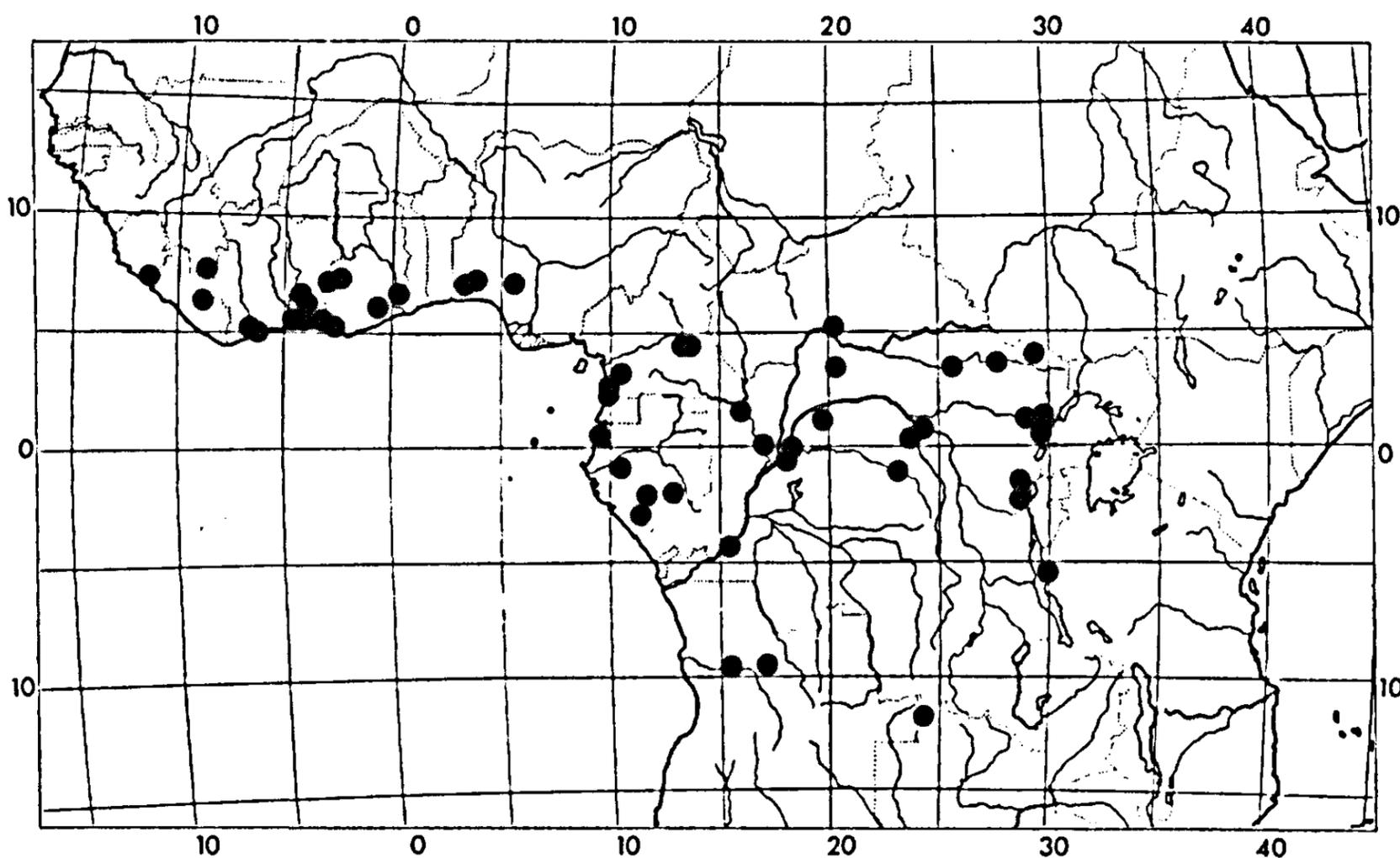
D. crassifolium var. *integrum*: 12. flower, $6\times$. (12. Klaine 1911).



the endocarp, 1–3 mm thick; endocarp bony, 1–2 mm thick, strongly grooved outside, smooth and glabrous inside (in immature state hairy inside). *Seed* subellipsoid, laterally compressed, ca 10 mm long: seedcoat brown, smooth, glossy, strongly veined.

Distribution: West and Central Africa, Western Tanzania, Northern Zambia.

Ecology: Rain forest or gallery forest; alt. 0–1700 m.



MAP 5. *D. crassifolium*

Key to the varieties

- Fully developed flowers with (3.5)4–6 mm long petals and stamens and 4–6(7) mm long pistil. var. **crassifolium**
- Fully developed flowers with 2.5 mm long petals, stamens and pistil. var. **integrum**

D. crassifolium* Chod. var. *crassifolium

D. crassifolium Chodat, 1895: 672; Hiern, 1896: 138; Engler, 1896-a: 348: 1896-b: 133; 1912-a: 566; De Wildeman, 1919: B24; Moss, 1928: 124; Engler & Krause, 1931: 6; Exell & Mendonça, 1951-b: 323; Torre, 1963: 322; Bretecher 1973: 18, 25, 85, 110, XVI; Punt, 1975: 23.

Type: Angola, Pungo Andongo, *Welwitsch* 4666 (holotype: G; isotypes: BM, BR, COI, K, LISU, P).

D. holopetalum Ruhland, 1902: 77 (non *D. holopetalum* Merrill, 1921): Th. & H. Durand, 1909: 94; Engler, 1912-a: 566; De Wildeman, 1919: B37; Hauman, 1958-a: 296. Type: Zaïre, Basankusu, *Dewèvre* 779 (holotype: BR: no isotypes).

D. brachysepalum Engler, 1912-b: 444. See Breteler, 1973: 103 for full details.

D. spathulatum Engler, 1912-b: 438; 1912-a: 565, nomen: De Wildeman, 1919: B66; Engler & Krause, 1931: 6; Hauman, 1958-a: 296. Type: Zaïre, Ituri, between Irumu and Mawambi, *Mildbraed* 2921 (holotype: B†; lectotype: B; isotype (fragment): BM).

D. malembense Pellegrin, 1922: 90. Type: Gabon, Nyanga Region, Malemba, *Le Testu* 2096 (holotype: P; isotypes: BM, BR, K, WAG).

D. palustre Louis ex Hauman, 1955: 346; 1958-a: 298. Type: Zaïre, Yangolo, *Louis* 12079 (holotype: BR; isotypes: K, LISU, M, P, SRGH).

D. palustre Louis ex Hauman var. *polyanthum* Hauman, 1955: 347; 1958-a: 298. Type: Zaïre, Lac Tumba, Elua I., *J. Léonard* 673 (holotype: BR; isotypes: K, LISC, LISU).

Homotypic synonym: *Chailletia crassifolia* Chod. ex Barth, 1896: 498–500. Type (lecto!): see under *D. crassifolium* var. *crassifolium*.

Specimens examined:

Liberia. Granfield, *Adam* 26118 (WAG); Nimba Mt., Jèkepa, *Adam* 27780 (BR, WAG); 2 mls E. of Tapitta, *Jansen* 890 (WAG).

Ghana. Sunyani-Ashanti, *Adams* 5319 (K); Atewa Range F.R., *Enti & Hossain* GC 38926 (WAG); *Hall & Hossain* GC 38906 (K, WAG); *Hall & Lock* GC 43679 (K, WAG); *Lock & Hall* GC 43531 (K, WAG); Tano R., *Oldeman* 816 (P, SRGH, WAG); Pamu, Berekum Res., *Vigne* 2485 (FHO).

Nigeria. Ondo prov., Owo distr., Ifon F.R., *Adebusuyi* FHI 43582 (FHI, K); Abeokuta prov., Egbado distr., *Onochie* FHI 32449 (K); 18 mls S. of Ibadan, *van Meer* 662 (FHI, SRGH, WAG).

Cameroun. 3 km W. of Bertoua, *Breteler* 2771 (BR, K, LISC, M, P, WAG); 35 km W. of Bertoua, *Breteler* 2973 (BR, K, P, WAG); Bipindi, *Zenker* 1682 (B, BM, BR, COI, E, G, GOET, K, L, LE, M, P, W, WU, Z).

Gabon. 50 km S.E. of Lambaréné, *Breteler* 5784 (WAG); 60 km S.S.W. of Moanda, *Breteler* 6944 (WAG); 6966 (WAG); 6967 (WAG); Malemba, *Le Testu* 2096 (BM, BR, K, P, WAG, type of *D. malembense*); Nzilacala, *Le Testu* 6479 (BM, P); Sangha R., N. of equator, *Mildbraed* 3802 (HBG, P).

Congo. M'Bamou I., *Sita* 2790 (WAG); 2850 (WAG).

Zaïre. Penghe-Irumu, *Bequaert* 2618 (BR); Eala, *Couteaux* 321 (BR, K); Basankusu, *Dewèvre* 779 (BR, type of *D. holopetalum*); Lac Kwada, *Evrard* 1311 (BR); Bambesa, *Gérard* 2502 (BR, K); near Banhongo, *Germain* 4967 (BR); Ikela, Lukenzu R., *Germain* 7446 (BR); Yangambi, *Germain* 8499 (BR); Yabwesu, *Germain* 8772 (BR, K); sin.loc., *Leemans* 537 bis (BR); Kikoma, *A. Léonard* 3084 (BR, WAG); Elua I., Lac Tumba, *J. Léonard* 673 (BR, K, LISC, LISU, type of *D. palustre* var. *polyanthum*); Eala, *J. Léonard* 766 (BR, C, M, PRE, SRGH); 6 km E. of Yangambi, *Louis* 4064 (BR, M, SRGH); 10182 (BM, BR, EA, LISU); 20 km E. of Yangambi, *Louis* 12079 (BR, K, LISU, M, P, SRGH, type of *D. palustre*); Yangambi-Yaosuka, *Louis* 13154 (BR, COI); Yangambi, *Louis* 13485 (BR, WAG); 16871 (BR); Muera, *Mildbraed* 2203 (B(?), BM, type of *D. brachysepalum*); Irumu-Mawambi, *Mildbraed* 2921 (B, BM, type of *D. spathulatum*); Bitale, *Pierlot* 1027 (BR, WAG); Eala-

Boyeka, *Robijns* 475 (BR, L, SRGH); Parc Nat. de la Garamba, *Troupin* 942 (BR); Yangambi, *Yafunga* 175 (BR, K).

Angola. Quela, *Nolde* 505 (BM, COI); Cazengo, *Welwitsch* 4665 (BM, COI (labeled: *D. welwitschii* Engl.), G, K, LISU, P); Pungo Andongo, *Welwitsch* 4666 (BM, BR, COI, G, K, LISU, P, type).

Central African Republic. Moroubas, *Tisserant* 1435 (BM, L); near Moroubas, Wuralé R., *Tisserant* 1445 (BM, L, P).

Zambia. Mwinilunga, *Holmes* 1208 (BR, K).

Cult. Netherlands. Wageningen, *Breteler* 7002 (WAG); 7518 (WAG).

Notes. RUHLAND compared his *D. holopetalum* with *D. barteri* and observed close affinities between these two species as regards their flowers. If he really compared it with *D. barteri* or with *Zenker* 1682, identified at Berlin as *D. barteri* but representing *D. crassifolium* var. *crassifolium*, will probably never be known. As the type material of *D. crassifolium* var. *crassifolium* does not have any flowers but fruits only, comparison with it is difficult. Moreover, this type specimen has thick leaves whereas the type of *D. holopetalum* has young, rather thin leaves. Careful examination of the available material shows that *D. holopetalum* is not distinct. Its type is poor and I could not verify RUHLAND's remark about the rather frequent 4-merous ovaries in this specimen. My investigation in *D. crassifolium* var. *crassifolium* as a whole, did not reveal that 4-merous ovaries are often present. In general, however, in species which normally have 3-merous ovaries, 4-merous ovaries may occur either in the same specimen or in different specimens (e.g. *D. arachnoideum* Bret., *D. bojeri* (Tul.)Engl., *D. heudelotii* (Planch. ex Oliv.)Baill.).

The type of *D. spathulatum* represents a form of *D. crassifolium* var. *crassifolium* with rather small leaves with a very distinct obtuse acumen as seen in the type of *D. brachysepalum*, also from Eastern Zaïre. This form does not merit any special status. The Berlin duplicate of the destroyed holotype has been selected as lectotype.

Had the type of *D. crassifolium* var. *crassifolium* also been flowering, the careful PELLEGRIN would probably not have described *D. malembense*. He observed that both were very much alike, only the flowers (!) being different, notably by the adnation of petals and filaments, which in fact is one of the flower characters of *D. crassifolium* var. *crassifolium*. I suppose that Mr. PELLEGRIN's observations were based on the floral remnants of the fruiting type material.

As has been observed before (BRETELER, 1973: 103), HAUMAN apparently never compared the Zaïre material with the type of *D. crassifolium* var. *crassifolium*, because the type of *D. palustre* does not show any differential character. The *D. palustre* var. *polyanthum* type is a specimen with inflorescences crowded on short leafless axillary shoots, a phenomenon which is not uncommon in *D. crassifolium* var. *crassifolium*.

D. crassifolium is common in Ivory Coast, but only sterile specimens have been collected in this country, mainly by the present author, as it can rather easily be distinguished in the field by its exudate from the bark.

D. crassifolium Chod. var. *integrum* (Pierre) Bret., *comb.nov.*

Basionym: *D. integrum* Pierre, 1904 (see notes). Type: Gabon, near Libreville, *Klaine 1911* (holotype: P; isotypes: BM, K, LE, WAG).

D. spathulatum Engler var. *integrum* (Pierre) Pellegrin, 1913: 641. Type: as above.

Specimens examined:

Cameroun. 45 km S. of Kribi, Campo Rd, *Bos & Breteler 7299* (WAG).

Gabon. Near Libreville, *Klaine 1911* (BM, K, LE, P, WAG, type); 3352 (P, WAG).

Notes. The name *D. integrum* Pierre, quoted in the Index Kewensis as *D. integrum* Pierre ex Pellegrin and by PELLEGRIN as a manuscript name, used by him to make the new combination *D. spathulatum* var. *integrum*, is effectively and validly published on March 25, 1904. Its publication was effected and became valid by distribution of indelible autograph (the copied drawing with details made after *Klaine 1911* by E. DELPY in 1903) when Mr. PIERRE gave both the detailed drawing as well as the specimen, both with duplicates, to the Museum in Paris on March 25, 1904, as stated on the printed label. A copy of this drawing and specimen was found in the Leningrad herbarium and is now also present in Wageningen.

PELLEGRIN distinguished this variety very well, not accepting this taxon at the specific level. So far only a few collections exist and fruits are unknown. The numbers *Bos & Breteler 7280* and *7282* most probably belong to var. *integrum* but unfortunately they are sterile.

The phenomenon that a species presents material with small and material with large flowers is also seen in *D. dewevrei* (see p. 53) and has also been observed in *D. madagascariense*.

The following examined specimens lack the necessary elements to identify them as belonging to one of the two varieties.

Sierra Leone. Near Zimi, *Deighton 3633* (K).

Ivory Coast. Km 56 Sassandra-Gagnoa, *Breteler 5854* (WAG); near Sassandra, *Breteler 5868* (WAG); near Aboisso, *Breteler 5927* (WAG); near Sassandra, *Breteler 6041* (WAG); 48 km N. of Abidjan, *Breteler 6088* (WAG); Km 40 Adzopé-Abengourou, *Breteler 6143* (WAG); N.W. of Kotobi, *Breteler 6174* (WAG); Km 32 Kotobi-Daoukro, *Breteler 6183* (WAG); Km 42 Ndouci-Dabou, *Breteler 6200* (WAG); 22 km Aboisso-Mamféré, *Breteler 7439* (WAG); 56 km N. of Sassandra, *Leeuwenberg 4016* (WAG).

Togo. Km 7 Palimé-Missahohe, *Breteler 7084* (WAG).

Nigeria. Sin. loc., *van Meer 1872* (WAG).

Cameroun. Km 40 Kribi-Campo, *Bos & Breteler 7280* (WAG); *7282* (WAG); 3 km W. of Bertoua, *Breteler 1873* (P, WAG); Batanga, *Dinklage 1054* (HBG).

Congo. Border of Sangha R., *Pobéguin 72 bis* (P); M'Bamou I., Bfoille region, *Sita 1789* (WAG).

Zaïre. Kapili R., *De Graer s.n.* (BR); 20 km W. of Yangambi, *Louis 11947* (BR).

Tanzania. Kigoma Distr., Kasakati, *Suzuki 50* (EA); *86* (EA); *94* (EA); *115* (EA).

D. cuneifolium Engl. = *D. heudelotii* (Planch. ex Oliv.)Baill.

D. cuneifolium Engler, 1896-b: 141: 1896-a: 349, nomen: 1912-a: 585: De Wildeman, 1919: B25; Exell & Mendonça, 1951-b: 329: Breteler, 1973: XVII: Punt 1975: 30. Type: Angola, Lunda, Luvo R., *Marques 212* (holotype: COI: isotypes: BM, LISU).

Note. *Marques 212* represents a form of the very variable *D. heudelotii* with somewhat cuneate, coriaceous, and rather glabrous leaves, which has also been described as *D. whitei* by TORRE. Its flowers do not differ from those of *D. heudelotii* and the leaf characters fit very well within the variability of this species.

D. cymosum (Hook.)Engl.

Fig. 7–8 Map 6

D. cymosum (W. J. Hooker) Engler, 1896-a: 349: 1911: 246: 1912-a: 575: 1915: 847, fig. 399: Eyles, 1916: 392: De Wildeman, 1919: B25; Moss, 1928: 127: Mogg, 1930: 368: Engler & Krause, 1931: 6: Léemann, 1935: 233: Wild, 1955: 50: Torre, 1963: 324: t. 63: Cleghorn & Hill, 1965: 99: Roessler, 1968: 85(1); Breteler, 1973: 4, 6, 12, 27, 32, 34, 36, 85, 106, 111, XVI: Punt, 1975: 4.

Basionym: *Chailletia cymosa* W. J. Hooker, 1843: t. 591: Harvey, 1860: 450.

Type: Republic of South Africa, Aapjes (Aapges) R., *Burke s.n.* (holotype: BM).

D. venenatum Engler & Gilg, 1903: 280: Engler, 1911: 244: 1912-a: 575, fig. 2: 1915: 846, fig. 398: De Wildeman, 1919: B71; Moss, 1928: 126: Engler & Krause 1931: 6, fig. 2: Exell & Mendonça, 1951-b: 324. Type: Angola, between Ediva and Humbe, *Baum 64* (holotype: B†: lectotype: M: isotypes: BM, BR, COI, E, G, K, W, Z).

D. bullockii Hauman, 1958-b: 74: Torre, 1963: 324: Breteler, 1973: 111. Type: Zambia, Mkupa, *Bullock 1196* (holotype: BR: isotype: K).

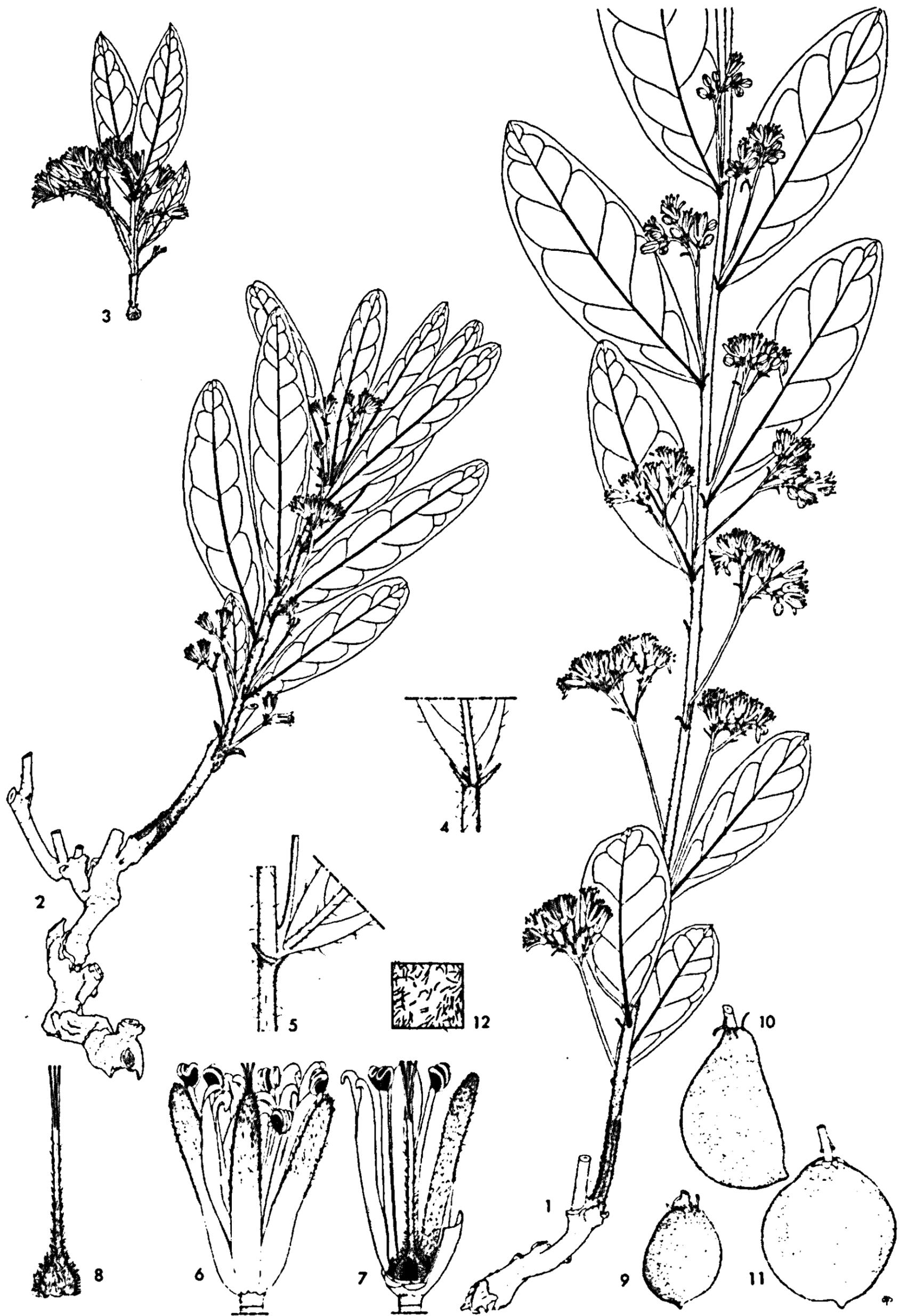
Diagnostic characters. A rhizomatous suffrutex, annually sprouting from a large, woody, densely branched subterranean base. Branchlets tomentose to glabrous or nearly so, quite often more densely hairy in the lower than in the upper part. Leaves sessile or nearly so, tomentose to glabrous, variable in size and shape, up to ca 12 times as long as wide, (2)5–13(16) × (0.5)2–4(7.5) cm, cuneate to rounded at base, obtuse to acute at apex. Inflorescences distinctly pedunculate, usually distinctly branched: peduncle free from the petiole but often shortly adnate to the branchlet. Flowers rather large, ca 5–8 mm long, with erect or nearly erect sepals, subequal in length to the petals and stamens. Fruits up to 4 × 3 cm, tomentose to glabrous.

Description. Plant with a large, woody, subterranean part with profuse horizontal branching bearing the aerial shoots. These shoots deciduous, when



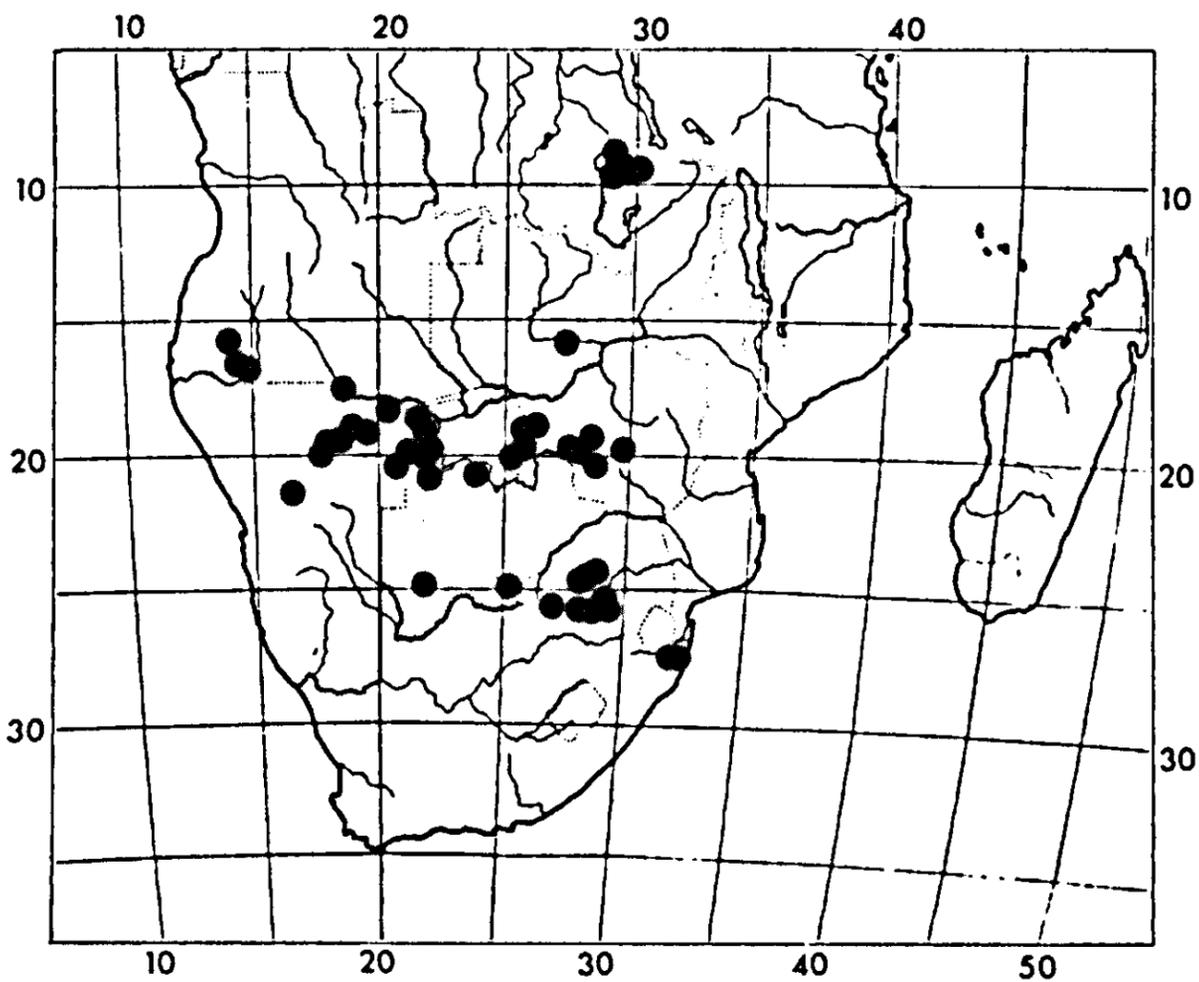
PHOT. 6. *D. cymosum*: flowering shoots. (Phot. J. N. ELOFF).

Meded. Landbouwhogeschool Wageningen 78-10 (1978)



annually burnt sprouting again at their base, when not sprouting higher. *Branches* glabrous or nearly so, with minute, numerous lenticels. The annual sprouts very variable in indumentum, from glabrous or nearly so to tomentose, quite often more densely hairy in the lower than in the upper part. *Stipules* narrowly triangular to subulate, (2)3–6(7) mm long, from tomentose to almost glabrous. *Leaves* sessile to subsessile, the petiole semi-terete, often canaliculate above, up to 3(6) mm long, sparsely hairy to tomentose; blade elliptic to obovate usually narrowly so to almost linear, up to ca 12 times as long as wide, (2)5–13(16) × (0.5)2–4(7.5) cm, cuneate to rounded at base, obtuse, rounded, or acute and usually mucronate sometimes emarginate at apex, tomentose or only with a few, subappressed hairs mainly on midrib and main lateral nerves and glabrescent, or glabrous, the nervation usually prominent both sides, at least in older leaves, the midrib stronger so below, the (5)6–9 (10) main lateral nerves on each side sometimes stronger so above, glands few, below only, often with a distinct pair near or at base. *Inflorescences* rather loose, up to ca 40-flowered, usually at least once distinctly branched, distinctly pedunculate, axillary or super-axillary by adnation of the peduncle to the supporting branchlet, tomentose to pilose to glabrous or nearly so, the lower ones on a branchlet often in the axils of strongly reduced, bract-like leaves; peduncle (i.e. the free part of the inflorescence stalk) (0.7)1–3(4.5) cm long, the adnation up to 1 cm long; bracts and bracteoles narrowly ovate-triangular to subulate, up to 3 mm long. *Pedicel* up to 6 mm long, the upper part at most 1 mm long, pubescent to glabrous or nearly so. *Sepals* erect to slightly spreading, free at base or nearly so, narrowly oblong, (4)5–8 × 1–2 mm, obtuse to acute at apex, partly or entirely pubescent both sides. *Petals* erect, at base very shortly adnate to filaments, narrowly oblong-elliptic to narrowly obovate in outline, (4.5)5.5–7.5(9) mm long, (0.5)2–4 mm split, glabrous or with a few appressed hairs outside below split, rarely so inside; lobes oblong, flat to slightly concave. *Stamens* erect (4.5)5–7.5 mm long, glabrous; anthers ca 1 mm long with a prominent connective. *Staminodes* glabrous, free or united into a thin, up to 1 mm high, lobate-crenate, cupular ring, when free subquadrate to oblong, flat, up to 1 × 1 mm. *Pistil* (2)3–4-merous, 5.5–9.5 mm long; ovary sericeous, style partly to entirely so, except for the up to 3.5 mm long lobes. *Fruits* 1–3(4?)-seeded, smooth, from tomentose to glabrous or nearly so, orange at maturity, apiculate or not; 1-seeded fruits: obliquely ellipsoid-obovoid, up to 4 cm long and 3 cm in diam.; exocarp at most 1 mm thick; mesocarp juicy; endocarp pergamentaceous, smooth and glossy inside. *Seeds* ellipsoid-obovoid, ca 2.5 × 1.5 cm, with a brown testa.

FIG. 7. *D. cymosum*: 1–3. flowering branchlets, $\frac{1}{2} \times$; 4. detail of leaf base with stipules, $1 \times$; 5. leafaxil showing adnation of peduncle and branchlet, $1 \times$; 6. flower, $4 \times$; 7. flower inside, $4 \times$; 8. pistil, $4 \times$; 9–11. fruits, $\frac{1}{2} \times$; 12. detail of fruit indumentum. (1, 6–8. Baum 64; 2. Van Vuuren 1192; 3. Meebold 16678; 4. Schoenfelder 191; 5. Schoenfelder 31; 9. Leeman s.n.; 10, 12. Plowes 1643; 11. De Menezes 3094).



MAP 6. *D. cymosum*

Distribution: Southern Angola. South West Africa, Zambia, Rhodesia, Botswana, Republic of South Africa.

Ecology: Tree & shrub savannahs, open grassy vegetations, in rocky as well as in sandy soils.



PHOT. 7. *D. cymosum*: sterile shoots. (Leeuwenberg 10896; phot. A. J. M. LEEUWENBERG).

Specimens examined:

Angola. Gambos, *Barbosa 10734* (BM, COI, LISC); between Ediva and Humbe, *Baum 64* (BM, BR, COI, E, G, K, M, W, Z, type of *D. venenatum*); near Roçadas, Chicusse, 28 km from Sa da Bandeira Rd, *Borges 299* (BM, BR, K, P); Gambos, *de Menezes 731* (K, LISC, P, WAG); 3086 (LISC, WAG); Cahame, *de Menezès 3087* (LISC); Ediva (Caluvango), *de Menezes 3093* (LISC, WAG); 3094 (LISC); Cahama, *de Menezes 3150* (WAG); Humbe, *de Menezes 3455* (BM); Gambos-Cahame, *de Menezes 3396* (BM, P, WAG); Cubangar, *Mendes dos Santos 2454* (LISC, LUAU); Mucope, *Santos & Barroso 2834* (LUAU, WAG).

Zambia. Mazabuka, *Anonymus (Central Research Station 133)* (PRE); Mkupa, *Bullock 1196* (BR, K, type of *D. bullöckii*); Mporokoso-Mkupa, *Bullock 1210* (K); Ifuna R., *Fanshawe 4693* (BR, EA, K, SRGH); Nsama, *Fanshawe 4811* (BR, K); Kawambwa, *Muti-mushi 418* (K); Mporokoso, *Richards 6304* (BR, K, WAG); Kawambwa, *White 3627* (FHO, K).

Rhodesia. Nyamandhlovu, *Armitage 323* (SRGH); Gwelo Res., *Biegel 293* (SRGH); Wankie, *Brain 9497* (SRGH); Umgusa, *Bryson 3/48* (SRGH); Bulawayo, *Chase 7217* (K); Lupane Distr., *Culver 13* (K, SRGH); Wankie, *Eyles 3668* (SRGH); Bulawayo, *Mundy 938* (SRGH); *Mundy 2596* (SRGH); Nyamandhlovu, *Plowes 1635* (K, PRE); 1643 (K, SRGH); Wankie, *Rushworth 1206* (K, SRGH); Nyamandhlovu, *West 2420* (K, SRGH); sin. loc., *Wild 352* (K).

South West Africa. Omaramba Mt., *Le Roux 235* (PRE); between Grootfontein and Okavango R., *Schmidt s.n.* (PRE); near Karakuwisa, *Schoenfelder 31* (PRE); Omuramba Omatako, *Schoenfelder 191* (PRE); Karakuwisa, *Schoenfelder 7726* (B); *s.n.* (herb. PRE 20405); km 40 Gam-Windhoek, *Story 5338* (PRE); Aha Mts, near Grootfontein, *Story 6308* (M); 80 km E. of Grootfontein, *van Vuuren 1192* (M, PRE); Mouth of the Omuramba Omatako R., *Volk 2046* (M).

Botswana. Ngamiland, *Curson 376* (PRE); Kazungula, N. of Tsous, *de Beer 903* (K, LISC, SRGH); E. of Odiakoe, *de Beer & Yalala 21* (BM, LISC, SRGH); Shakawe, *De Winter & Wiss 4408* (PRE); Gomare, *Guy 63/64* (SRGH); Kobe, *Lee GN11* (SRGH); Ngamiland distr., between Nata and Tamasetse, *Pole Evans 4631* (PRE, SRGH); 28 mls W. of Mabeleapudi, *Rains & Yalala 9* (K, SRGH); Shakawe, *Story 4805* (K, LISC); 40 mls E. of Kaikai, *Story 5109* (K); Kobe distr., *Yalala 206* (K, SRGH); Kanye distr., Ranaka, *Yalala 384* (SRGH); Northern distr., Panda-ma-tenka Rd., *Yalala 469* (SRGH); near Katere, *Watt 11* (M).

Republic of South Africa. Pretoria, *Brain 10157* (SRGH); Rustenburg, *Brock 1418* (G, UPS, W, Z); Aapjes R., *Burke s.n.* (BM, type); Nijlstrom, *Burt-Davy 2358* (PRE); Pretoria, *Burt-Davy 2636* (PRE); Rustenburg, *Codd 8669* (PRE); Pretoria, *Conrath 199* (Z); *de Winter 401* (BM); near Naboomspruit, *Edwards in Galpin 14662* (PRE); Pretoria, near Derdepoort, *Eloff s.n.* (WAG); Pretoria, near Meintje'skop, *Eloff s.n.* (WAG); Potgietersrust, *Galpin 14663* (PRE); Zululand, Mbazwane, *Gerstner 3696* (PRE); Pretoria, *Giglioli & Bettini s.n.* (FI); Rustenburg, *Greeff s.n.* (G); near Pretoria, Wonderboompoort, *Humbert 10548* (P, WAG); 10548 bis (P); Pretoria, Magaliesberg, *Jones 257* (SRGH); *Kinges 1016* (M); Pretoria, Monumentpark, *Lanjouw c.s. 623* (U); Pretoria, Rietendale, *Leeman s.n.* (PRE, W); Pretoria, *Leendertz 198* (L); Waterberg distr., km 43 Nylstrom-Vaalwater, *Leeuwenberg 10896* (WAG); Pretoria, *Marloth 9518* (PRE); Middelburg, *Marloth 11753* (PRE); Ashbury, *Meebold 12990* (M); Pretoria, *Meebold 16678* (HBG, M); Pretoria, Donkershoek, *Merxmüller 396* (BM, LISU, M, W); 8 mls from Nijlstrom, Modderpoort, *Moerdijk s.n.* (PRE); Pretoria, Tweintjes Kop, *Mogg 15353* (UPS); Loskop Dam Nat. Res., *Mogg 29520* (K); *Mogg 30545* (SRGH); Pretoria, *Mogg s.n.* (PRE); Pretoria, Magaliesberg, *Mogg s.n.* (L); Pretoria, *Moss 11935* (BM, Z); Rustenburg, *Pegler 1007* (PRE); Pretoria, Groenkloof, *Phillips s.n.* (PRE); Pretoria, Meintje'skop, *Pole Evans s.n.* (Z); Aapjes R., *Rehman 4338* (BM, Z); Pretoria, Wonderboompoort, *Rehman 4591* (Z); Pretoria, *Rogers 23270* (Z); Magaliesberg, *Smith 645* (G); Pretoria, *Smith 3363* (PRE); 3398 (K); 6833 (PRE); *Stauffer & Scheepers 5240* (G); *Strey & Tom 3123* (M, SRGH); Natal, Ubombi distr., Mkuze Game Res.,

Strey 6620 (G, PRE); 20 mls Bronkhorstspruit-Witbank, *Taat 32* (U); Soutpansberg, *Thomas s.n.* (PRE); Pretoria, *Verdoorn s.n.* (PRE); near Nijlstrom, *Wall 136* (LD); Magaliesberg, Aapjesrivier, *Zeyher 536* (B, E, FI, G, LE, LD, P, PRE).

Notes. As the type of *D. venenatum* fits entirely within the variability of *D. cymosum*, ROESSLER (l.c.) is followed who reduced *D. venenatum* into synonymy of *D. cymosum*.

HAUMAN based *D. bullockii* on a small-flowered, narrow-leaved, rather glabrous specimen from Northern Zambia. Fig. 8 shows that the leaf variation in *D. cymosum* does not permit separation of the narrow-leaved specimens (no. 6, 7, 8). As regards the flower size it can be observed, that the narrow-leaved specimens usually have indeed smaller flowers than the average, but such small-sized flowers do occur in comparatively broad-leaved specimens as well, e.g. in *Pole Evans 4631* from Botswana and *Schoenfelder 191* from South West Africa.

The narrow-leaved specimens from Northern Zambia are usually glabrous or nearly so, but the type of *D. bullockii* has both nearly glabrous as well as quite hairy sprouts on the common woody base. This combination of hairy and glabrous shoots can also be observed in broad-leaved specimens e.g. in *de Menezes 3396* from Angola.

As a further distinguishing character, HAUMAN mentioned the long-hairy ovary in *D. bullockii* versus the short-hairy ovary in *D. venenatum*. However, careful scrutiny of all available material has revealed no significant difference in ovary indumentum.

In view of these circumstances and notwithstanding its somewhat different aspect, *D. bullockii* is not considered specifically different and must be treated as a synonym of *D. cymosum*.

D. cymosum flowers have often been reported as odoriferous. Flowers are produced abundantly, resulting in very limited number of fruits, a phenomenon also observed in other species, e.g. in the related *D. barteri* (see BRETELER, 1973: 34). The fruits appear to be edible. SCHOENFELDER (collection no 31) reports that the fruits 'are eaten peeled in great quantities by the Kung Bushmen. When still green can be eaten after baking in hot ash'. But the same collector mentions that 'the peel of the fruit is stamped and mixed with other food to poison stealing dogs'.

The poisonous properties of the young *D. cymosum* (Gifblaar) leaves are very well known (see also BRETELER, 1973: 36) and have led to several publications, some of which have been cited under this species. An investigation dealing with the aut-ecology of Gifblaar is published by MOGG (l.c.), who distinguishes in *D. cymosum* 3 new forma's besides the type-form: Forma α , the Narrow-leaved Gifblaar, Forma β , the Broad-leaved Gifblaar, and Forma γ , the Hairy-leaved Gifblaar. All these forms do indeed exist, but are difficult to separate as there are as many intermediates. Moreover, MOGG's forma's have no official status in the form published.

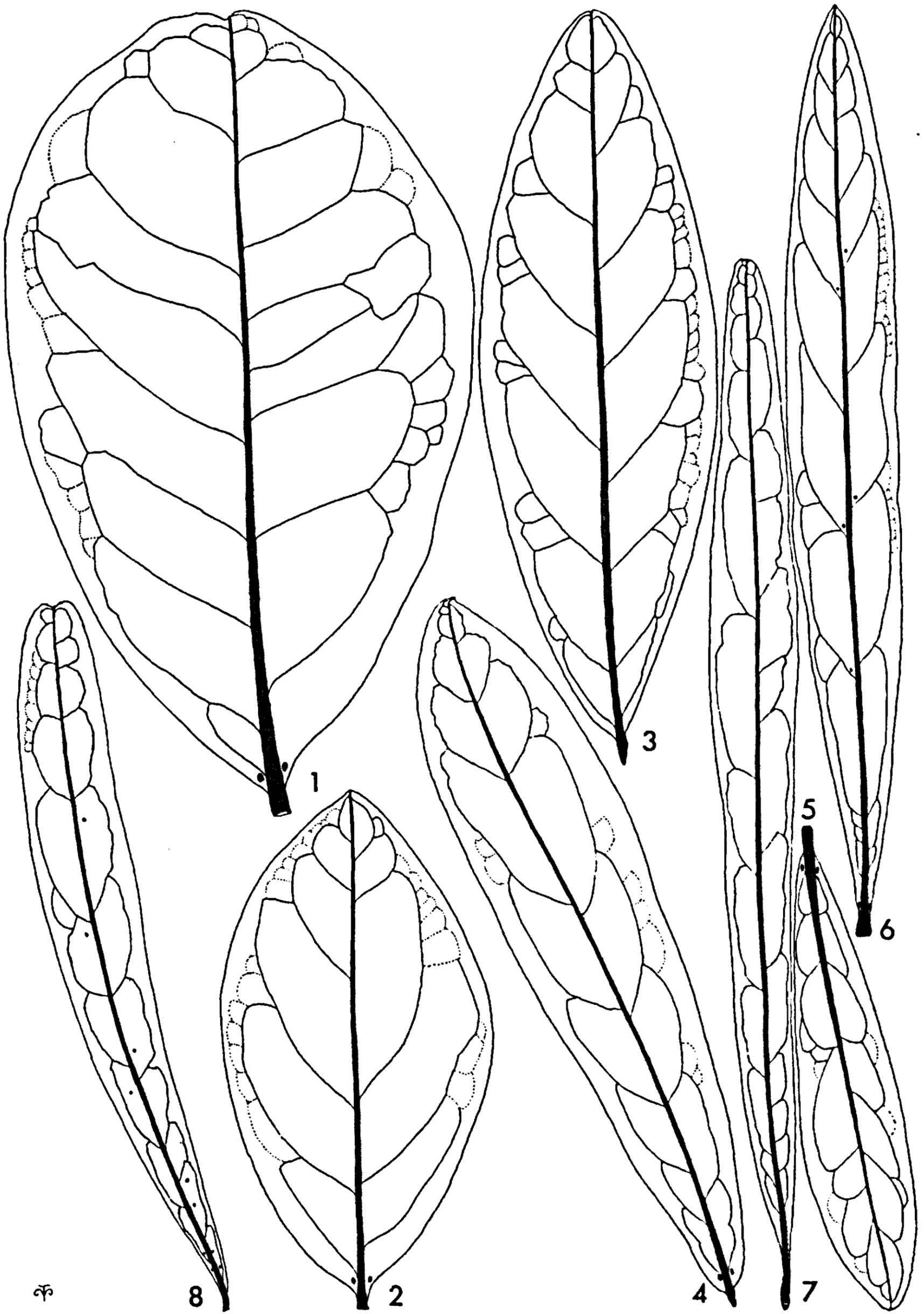


FIG. 8. *D. cymosum*: leaf variation, all leaves seen from below, $\frac{5}{6} \times$. (1. Gerstner 3696; 2-3. Edwards in Galpin 14662; 4. Santos & Barroso 2834; 5. Jones 257; 6. Codd 8669; 7. White 3627; 8. Fanshawe 4693).

D. cymulosum (Oliver)Engler. 1896-a: 349: 1912-a: 570: Pellegrin. 1913: 646: De Wildeman, 1919: B25; Hutchinson & Dalziel, 1928-a: 325, p.p.; Keay, 1958: 436, p.p.: Breteler. 1970: 7: 1973: 28, 33, 98. XVI: Punt. 1975: 29. p.p.

Basionym: *Chailletia cymulosa* Oliver. 1868: 340.

Type: Cameroun. Cameroon R. (= Wouri R.). *Mann 2200* (holotype: K: isotype: P).

D. chartaceum (Wright)De Wildeman. 1919: B23. Basionym: *Chailletia chartacea* Wright. 1896: 160. Type: Cameroun. Batanga. *Bates 337* (holotype: K: isotypes: BM. BR. Z).

D. riparium Engler. 1912-a: 577: De Wildeman. 1919: B62. Type: Cameroun. Grand Batanga. *Ledermann 187* (holotype: B†: lectotype: BM).

D. subuncinatum Engler. 1912-a: 567: De Wildeman. 1919: B68. Type: Cameroun. Bipindi. *Zenker 1880* (holotype: B†: lectotype: Z: isotypes: BM. E. G. GOET. K. LE. P. W. WU).

Diagnostic characters. Liana, lianescent shrub, or shrub with hollow stem and usually hollow branches. Branchlets glabrescent, soon lenticellate. Stipules simple, often early caducous. Leaves drying dark-brown to black, shortly petioled, the blade often bullate between the lateral nerves, elliptic to obovate, often narrowly so, usually long-acuminate, the midrib hairy above. Inflorescences usually grouped on short, leafless, axillary shoots which may easily be taken for a glomerule-like inflorescence. Sepals reflexed. Petals more or less as long as the sepals, 1–1.5 mm split. Stamens slightly longer than the petals. Pistil 3-merous, the ovary with short, erect hairs. Fruit subglobose to subellipsoid, 2–3.5 cm in diam., smooth, glossy, glabrous, orange at maturity.

Description. Liana, lianescent shrub, or shrub. *Stem and branches* hollow, at least the orthotropic ones, lenticellate, the lenticels rather small but distinct, usually in distinct rows on the orthotropic shoots: bark pale brown to black, smooth or finely longitudinally fissured: wood hard, the wood cylinder entire to very shallowly lobed. *Branchlets* subappressed-pubescent to puberulous, usually soon glabrescent, soon lenticellate. *Stipules* narrowly triangular to subulate, 1–3 mm long, subappressed-pubescent, often early caducous. *Leaves*: petiole subterete 1–3(4) mm long, subappressed-pubescent, often more densely so above, glabrescent: blade drying dark brown to black, elliptic to obovate, often narrowly so, rarely ovate, (3)8–12(15) × (1)3–4(5) cm, usually obtuse to rounded at base, usually long-acuminate at apex, the acumen up to 2 cm long, acute or mucronate, with (5)6–8(9) main lateral nerves on each side of the midrib, the blade often bullate between them, when young densely subappressed-pubescent on midrib above, more sparsely so on margin and on midrib and main lateral nerves below, glabrescent; glands small, inconspicuous, not always present, when present usually only below, rather near base. *Inflorescences* usually grouped on very short, leafless, axillary shoots which may

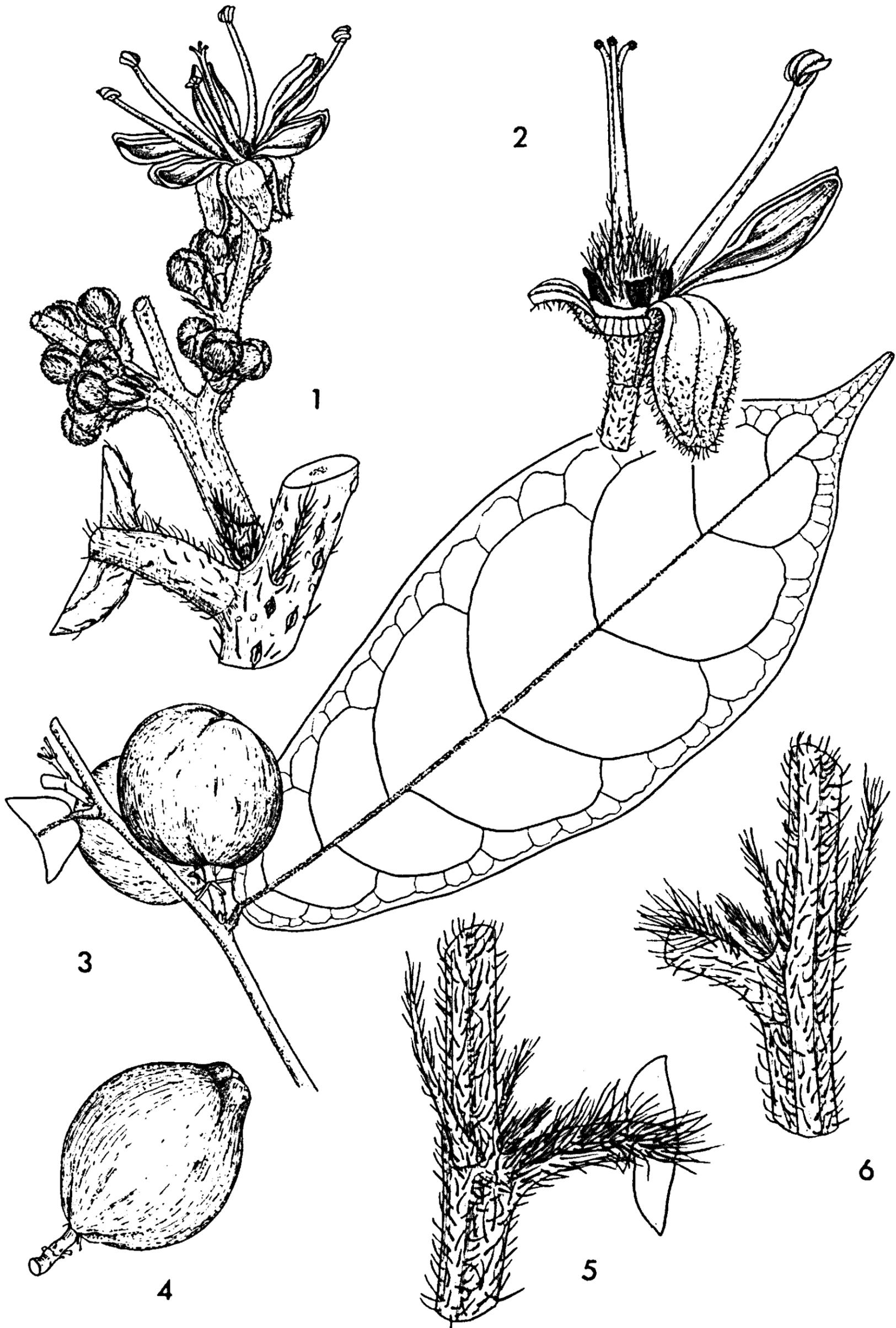


FIG. 9. *D. cymulosum*: 1. inflorescence, $5\times$; 2. flower, sepals, petals, and stamens partly removed, $10\times$; 3. fruiting branchlet, $\frac{5}{6}\times$; 4. fruit, $\frac{5}{6}\times$; 5-6. axil with unequal stipules, $10\times$. (1-2. Bos & Breteler 3066; 3, 5-6. Bos & Breteler 3059; 4. Bos & Breteler 3064).



PHOT. 8. *D. cymulosum*: part of flowering branchlet. (Breteler 7549; phot. H. C. D. DE WIT).

easily be taken for glomerule-like inflorescence. rarely single in the axil. 1–2 times distinctly branched, usually distinctly pedunculate, up to 12(30)-flowered, appressed-pubescent to puberulous: peduncle 1–4(6) mm long: bracts and bracteoles triangular. up to 1 mm long. *Pedicel* up to 4 mm long. the upper part at most 1 mm long. usually less. sparsely appressed-puberulous. *Sepals* reflexed. very shortly united at base. elliptic, obovate. or oblong. 2–2.5 × ca 1 mm. acute-truncate at top. puberulous outside. inside puberulous-tomentelous on upper half or apical part only. *Petals* erect to slightly spreading. at base shortly adnate to the filaments, obovate to narrowly obovate in outline, tapering to a narrow base. 2.5–3(3.5) mm long. 1–1.5 mm split. glabrous. *Stamens* erect to slightly spreading. distinctly longer than the petals. 3–4(4.5) mm long. glabrous: anthers up to 0.5 mm long. connective not very prominent. *Staminodes* obovate-oblong in outline. rather flat. up to 0.5 × 0.2 mm. obtuse-truncate or bilobed to 2–3-toothed at top. glabrous. *Pistil* 3-merous (rarely 2-merous). 3–4(4.5) mm long: style glabrous or with a few hairs. (2)3-lobed at top. the lobes at most 0.5 mm long: ovary subglobose to ovoid. with short erect hairs. *Fruits* subglobose to ellipsoid. sometimes more or less apiculate. sometimes very slightly lobed at top (Fig. 9: 4). 1–3-seeded. smooth. glossy. glabrous. yellow to orange at maturity: 1-seeded fruits 2–3.5 cm in diam.: exocarp 2–5 mm thick, rather firm; mesocarp juicy, ca 2 mm thick; endocarp fibrous, leathery, smooth and glossy inside, with a small hole apically. *Seed* somewhat irregular in shape, broadly subovoid in outline, laterally compressed,

PHOT. 9. *D. cymulosum*: seedling. (Breteler 6215; phot. H. C. D. DE WIT).



ca 1.5 cm long, 1.3–1.5 cm broad, ca 1 cm thick, with an obtuse to truncate or subcordate base; seedcoat smooth, glossy, dark brown to black, with a sub-circular 1–2 mm wide hole next to the hilum and corresponding with the hole in the endocarp.

Seedling with a firm taproot. the epicotyle up to ca 9 cm long. subappressed-pubescent. bearing some cataphylls: the leaves rather crowded. the first ones alternate. relatively broader than the subsequent ones.

Distribution: South-West Cameroun.

Ecology: Rainforest-area: often found on roadsides or in anthropogenous savannah.

Specimens examined:

Cameroun. Batanga, *Bates* 337 (BM, BR, K, Z, type of *D. chartaceum*): 5 km S. of Kribi. *Bos en Breteler* 3053 (WAG); 3059 (WAG): km 20 Kribi-Lolodorf, *Bos en Breteler* 3064 (WAG); 5 km S. of Kribi, *Bos en Breteler* 3066 (WAG); 3102 (WAG): 6 km S. of Kribi, *Bos* 3249 (WAG); 4255 (WAG); 4933 (WAG): km 20 Kribi-Lolodorf, *Bos* 5043 (WAG); 5055 (WAG); 5056 (WAG): km 38 Kribi-Lolodorf, *Bos* 5176 (WAG); km 10 Kribi-Lolodorf, *Bos* 5201 (WAG); 6 km S. of Kribi, *Bos* 5237 (WAG); *Bos* 5317 (WAG): 30 km S. of Kribi, *Bos* 7024 (WAG); Ebéa, 36 km N. of Kribi, *Bos* 7091 (WAG): sin. loc., *Braun* 29 (BM, BR, K, Z); 155 (BM); ca 50 km S. of Kribi, Campo Rd, *J. J. de Wilde* 8315 (WAG); km 16 Kribi-Ebolowa, *J. J. de Wilde* 8424 (WAG); Grand Batanga, *Ledermann* 187 (BM, type of *D. riparium*); Tonde, 25 km N.N.E. of Douala, *Letouzey* 14920 (P, WAG): Cameroon R. (= Wouri

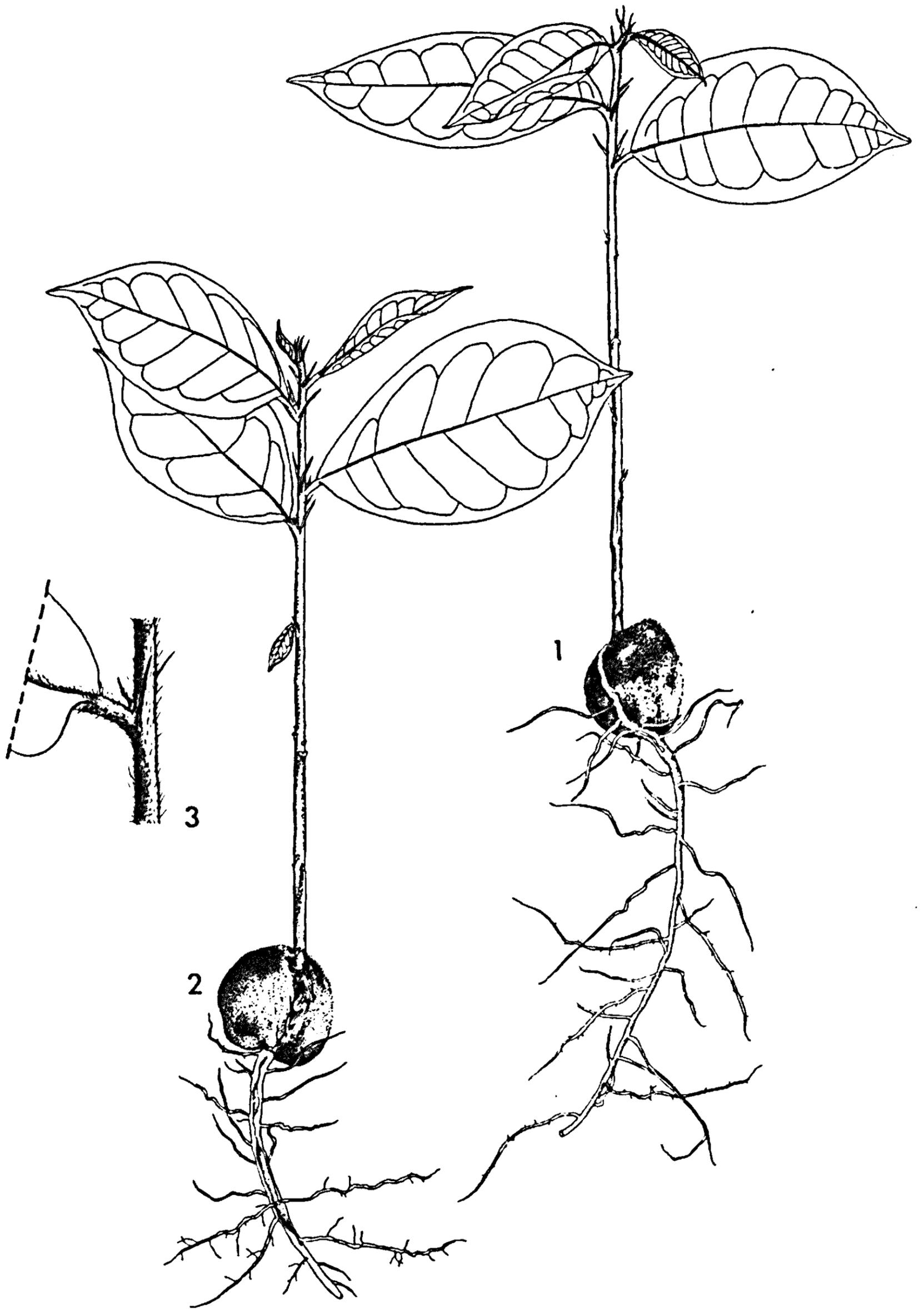
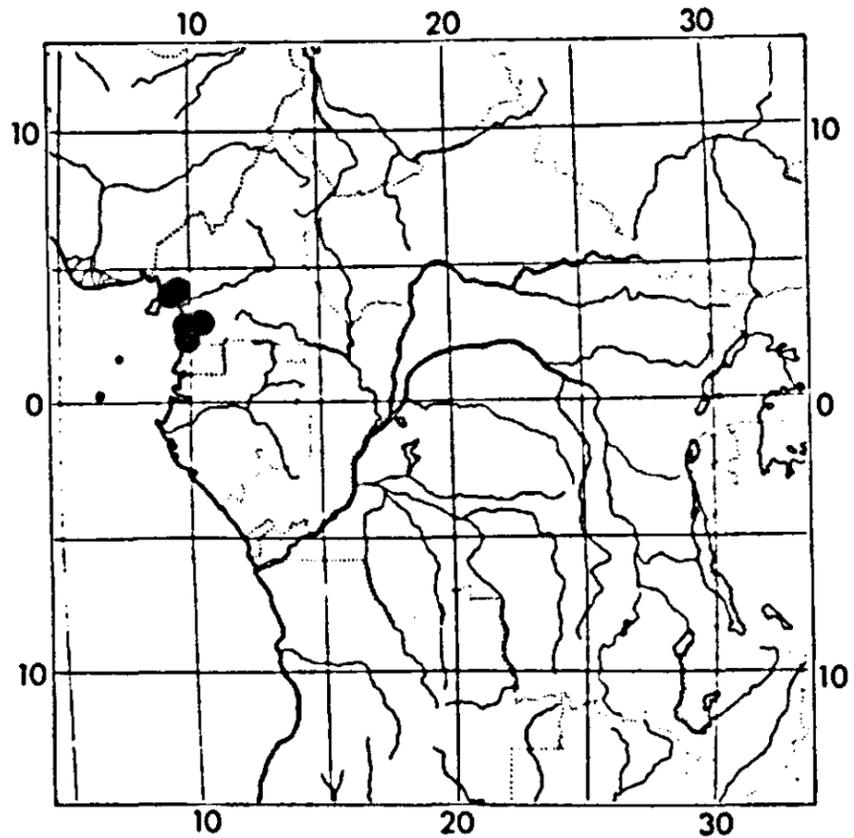


FIG. 10. *D. cymulosum*: 1-2. seedlings, $\frac{5}{6}\times$; 3. detail of branchlet with stipules, $3\times$. (1-3. Breteler 6205).

MAP 7. *D. cymulosum*



R.), *Mann 2200* (K, P, type); 25 km E. of Grand Batanga, *Mildbraed 6126* (BM, HBG): Bipindi, *Zenker 1880* (BM, E, G, GOET, K, LE, P, W, WU, Z, type of *D. subuncinatum*).

Cult. Ivory Coast (seedlings). Adiopodoumé. *Breteler 6205* (WAG).

Cult. Netherlands (mainly seedlings). Wageningen, *Breteler 6215* (WAG): 6216 (WAG): 6217 (WAG): 6231 (WAG): 6232 (WAG): 7549 (WAG).

Notes. The type of *Chailletia chartacea*. *Bates 337*. fits entirely within *D. cymulosum*. It originates from an area where *D. cymulosum* is very common. WRIGHT described *Chailletia chartacea* as having only one ovule in each ovary cell. This is not correct. but the two ovules found in each locule are collateral and may easily be taken for a single ovule.

The type of *D. riparium* was lost at Berlin and the fragment at BM has been designated lectotype. This fragment, although of poor quality, proves that *D. riparium* is synonymous with *D. cymulosum*. ENGLER's description, however, is ambiguous. The parts concerning the vegetative elements, the inflorescence, and the fruits, clearly match *D. cymulosum*, but the flower description does not fit *D. cymulosum*, as 6 mm long petals, 7 mm long stamens, and 8 mm long pistils have never been observed in this species. This ambiguity is attributed to inaccuracy of ENGLER, examples of which are given in this paper on p. 81 under *D. fuscescens*, and in BRETELER, 1973: 44 under *D. adnatiflorum* and p. 86 under *D. batesii*.

A similar instance of inaccuracy can be observed in ENGLER's description of *D. subuncinatum*. Here once more the description of the vegetative elements as well as that of the inflorescence fits the isotypes very well and points undoubtedly to *D. cymulosum*. The measurements of the flower parts given (sepals, petals, stamens, and pistil 1–1.5 mm long), point either to a different species or to a rather young flowerbud of *D. cymulosum*. The latter assumption may very well be correct as ENGLER described the type as being out of flower ('verblüht'), a condition which is confirmed by the isotypes examined which do bear some rather young flowerbuds.



PHOT. 10. *D. cymulosum*: inflorescence with leaf base showing two nectar producing glands (see p. 47). (*Breteler 7549*; phot. H. C. D. DE WIT).

The type of *D. cymulosum* collected by MANN at the Cameroon R., has been quoted by HUTCHINSON & DALZIEL (l.c.) as being collected in South Nigeria, followed by the present author in 1970: 7: 1973: XVI. KEAY (l.c.) quoted it from the former British Cameroons. According to M. LETOUZEY (personal communication) Cameroon R. is synonymous with Wouri R., which means that *D. cymulosum* does not occur in the F.W.T.A.-area, as MANN's locality represents at present the western limit of the species distribution.

When describing *D. dictyospermum* and *D. filicaule* (BRETELER, 1970: 7) the present author expressed his doubt whether the 3 LE TESTU specimens (no's 2081; 2106; 6060) from Gabon belong to *D. cymulosum*. When dealing with *D. bodyi* (BRETELER, 1973: 96) from Congo and Zaïre these specimens were kept separate from this species as well. A careful detailed comparison of the material of *D. cymulosum* with that of *D. bodyi*, has revealed that the 3 LE TESTU specimens do represent *D. bodyi* and not *D. cymulosum*. It should be emphasized, however, that both species are very closely related (for relationships with other species see under *D. filicaule*, p. 75), but as long as the fruits of *D. bodyi* remain unknown it is preferred to retain both as distinct species. The character used so far to separate both species i.e. reflexed versus erect sepals (BRETELER, 1973: 98) can no longer be used as the *D. bodyi* material from Gabon shows reflexed sepals, a common feature in *D. cymulosum*. The small differences by which both species may be separated at present are the following:

- Leaves drying greenish to pale brown. (8)11–15(18) × 3.5–6(9) cm. midrib above glabrous or nearly so: petals (2.5)3.5–4.5 mm long. pistil (3.5)4–5.5 mm long. **D. bodyi**
- Leaves drying dark brown to black. (3)8–12(15) × (1)3–4(5) cm. midrib above always distinctly hairy: petals 2.5–3(3.5) mm long. pistil 3–4(4.5) mm long. **D. cymulosum**

A specimen of *D. cymulosum*, grown from a seedling of *Bos & Breteler 3066*, has been flowering at the Wageningen conservatory. The flowers are fragrant early in the morning and most probably also at night. The leaves supporting open flowers in their axils usually showed nectar producing glands on their lower surface (Phot. 10), while the leaves with sterile axils usually did not. The flowers themselves did not have any nectar. This may point to an important function of these extra floral nectaries.

D. deflexum (Kl.)Engl.

Fig. 11 Map 8

D. deflexum (Klotzsch)Engler. 1895: 235. p.p.: 1896-a: 349: 1912-a: 575. p.p.; De Wildeman, 1919: B25, p.p., B61, p.p. (as *D. reflexum*); Moss, 1928: 128. p.p.: Engler & Krause. 1931: 6: Torre. 1963: 323. p.p.: Breteler. 1973: 4. 64. 68. XVI: Punt. 1975: 16–17.

Basionym: *Chailletia deflexa* Klotzsch. 1861: 109. t. 20: Oliver. 1868: 343 (as *C. reflexa*). p.p.

Type: Mozambique. Cabaceira Peninsula (15° S.), *Peters s.n.* (holotype: B†: lectotype: G).

D. mendoncae Torre. 1962: 67: 1963: 323. Type: Mozambique. Massinga. Inhacengo. *Mendonça 1895* (holotype: LISC: isotypes: BR. COI. K. SRGH. WAG).

Diagnostic characters. Liana or lianescent shrub, sometimes a rhizomatous shrublet. Stipules simple, narrowly triangular-subulate, 1–5 mm long. Petiole 2–5 mm long, the blade (2)4–8 × 1–3(4) cm, obtuse to subcordate at base, rounded to obtuse and mucronate, or acute at apex, when young sparsely subappressed-hairy, more densely so on midrib: glands when present inconspicuous, below only. Inflorescences rather loose, usually distinctly pedunculate, distinctly branched, the peduncle adnate to the petiole or not. Sepals spreading-reflexed. Petals erect or spreading, 3–4 mm long, 1.5–2.5 mm split, glabrous or nearly so. Stamens as long as the petals, glabrous. Pistil 3-merous: ovary lanate: style shortly or deeply 3-lobed. Fruit ca 2 cm in diam., velutinous.

Description. Liana, lianescent shrub, or a small rhizomatous shrublet. *Branches* glabrous or glabrescent: lenticels small, numerous or not. *Branchlets* subappressed-pubescent, glabrescent. *Stipules* narrowly triangular to subulate, 1–5 mm long, appressed-pubescent. *Leaves*: petiole suberete, 2–5 mm long, when adnate to the peduncle usually longer than when free from the peduncle, densely subappressed-pubescent: blade elliptic, often narrowly so, (2)4–8 × 1–3(4) cm, obtuse to subcordate at base, obtuse or rounded, acute or mucronate, sometimes slightly acuminate at apex, when young sparsely subappressed-pubescent more densely so on midrib and sometimes the margin, glabrescent, nervation rather prominent both sides, the 5–8 main lateral nerves on each side of the midrib not very conspicuous, glands when present small, inconspicuous, below (usually near leaf base) only. *Inflorescences* rather loose, at least once distinctly branched, usually distinctly pedunculate, up to 40(50)-flowered, subappressed-pubescent: peduncle free or adnate to the petiole (2)4–5(9) mm long: bracts and bracteoles narrowly triangular to subulate, 1–2 mm long. *Pedicel* up to ca 6 mm long, the upper part 1–1.5 mm long, appressed-pubescent. *Sepals* spreading to reflexed, free or slightly united at base, narrowly oblong-elliptic to obovate, 2.5–3.5 × ca 1 mm, acute to obtuse at apex, appressed-pubescent to tomentose outside, usually appressed-puberulous on upper part inside. *Petals* erect or spreading, at base very shortly adnate to filaments, narrowly obovate in outline, 3–4 mm long, 1.5–2.5 mm split, usually with a few stiff hairs below split outside, inside glabrous: lobes concave, often spreading. *Stamens* as long as the petals, glabrous: anthers ca 0.5 mm long, with prominent connective. *Staminodes* minute, subquadrate, less than 0.5 × 0.5 mm, glabrous, truncate or emarginate at apex. *Pistil* 3-merous, 3–4.5 mm long: style glabrous or nearly so, shortly 3-lobed or 3-cleft down to the ovary, the lobes up to 3 mm long: ovary subglobose, lanate. *Fruits* (only one fruiting specimen seen!) subglobose to ellipsoid, ca 2 cm in diam., 1(–3?)-

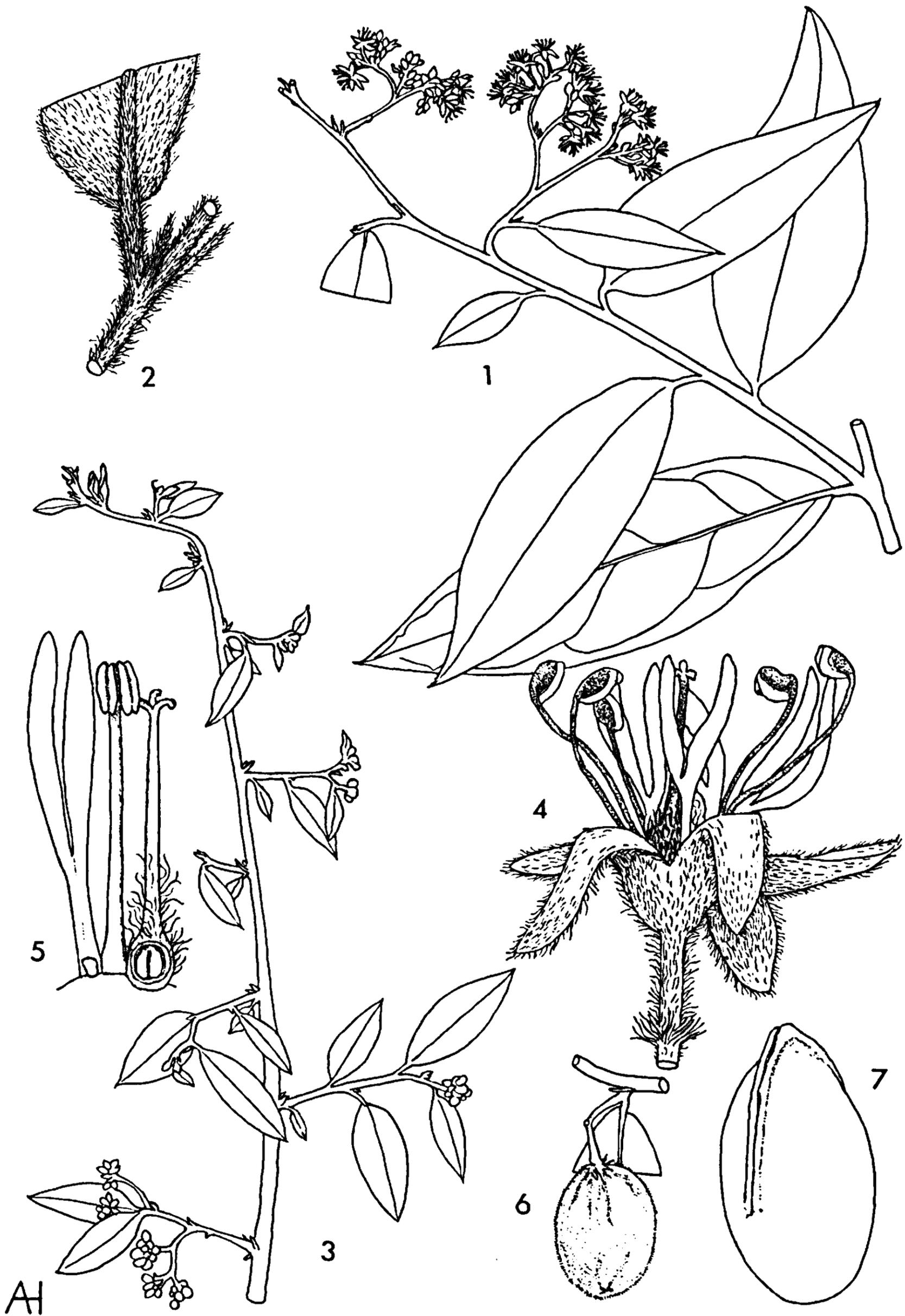
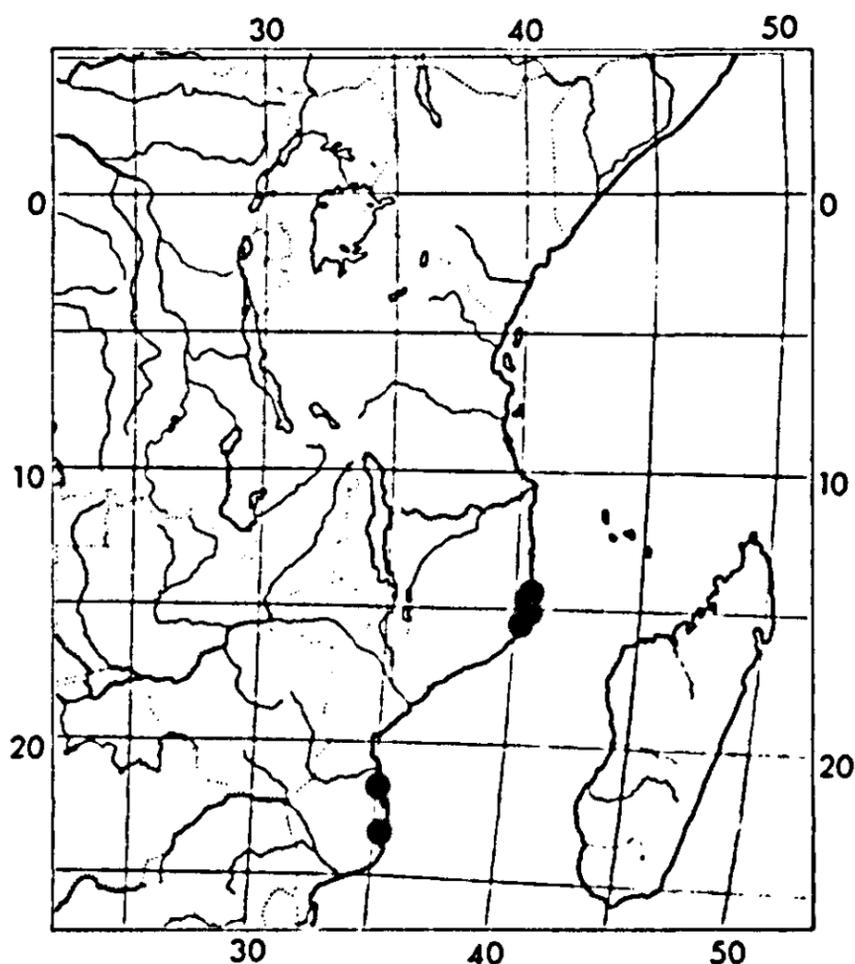


FIG. 11. *D. deflexum*: 1. flowering branchlet, $\frac{5}{6} \times$; 2. axil with stipules, $3 \times$; 3. apical part of lianescent shoot, $\frac{5}{6} \times$; 4. flower, $8 \times$; 5. flowerparts, $10 \times$; 6. fruit, $\frac{5}{6} \times$; 7. endocarp, $2\frac{1}{2} \times$. (1, 4-5. Santos jr. s.n.; 2, 6-7. Correia 49; 3. Mendonça 1895).



MAP 8. *D. deflexum*

seeded. densely velutinous. orange at maturity: mesocarp juicy: endocarp coriaceous to pergamentaceous. smooth and glabrous inside. *Seed* ellipsoid, ca 10×7 mm.

Distribution: Mozambique.

Ecology: Mixed woodland. bush, probably also in open grassy vegetations.

Specimens examined:

Mozambique. Nacala Nova, *Correia 49* (LISC): Cabaceira Peninsula, Mossuril. *de Carvalho s.n.* (COI): between Vilanculos and Macovane, *D'Orey 14* (LISC): Massinga. Inhacengo, *Mendonça 1895* (BR, COI, K, LISC, SRGH, WAG, type of *D. mendoncae*): Niasa (?), Ferão Veloso, *Pedro & Pedrogao 4807* (EA): Cabaceira Peninsula, *Peters s.n.* (G. type): near Mogincual, *Santos jr. s.n.* (K, LISC).

Notes. The holotype of *D. deflexum* was lost at Berlin. The fragment at Geneva, although of poor quality, has been designated lectotype.

TORRE based *D. mendoncae* on the following differential characters: loose branching, small leaves and a 3-lobed to 3-partite style. The type, *Mendonça 1895*, has indeed smaller leaves than generally seen in *D. deflexum*, but *D'Orey 14* shows small as well as large leaves on the same branchlet. As regards the branching, *Mendonça 1895* represents the apical part of a lianescent shrub which is usually loosely branched. The third character mentioned does not constitute a differential character either. 3-lobed to 3-partite styles may occur throughout the material examined, e.g. in *Pedro & Pedrogao 4807*. Consequently *D. mendoncae* is synonymous with *D. deflexum*.

D. deflexum has frequently been quoted from Tanzania as well. *D. deflexum*, however, is restricted to Mozambique, and the Tanzania material belongs to a

quite different species, which has been described as *D. arenarium* (see BRETELER, 1973: 64, 68).

According to the collector SANTOS JR., *D. deflexum* is poisonous to livestock, as he wrote on the label: *Planta venenosa: '20 folhas matam um boi ou um cabrito'*.

D. dewevrei De Wild. & Th.Dur.

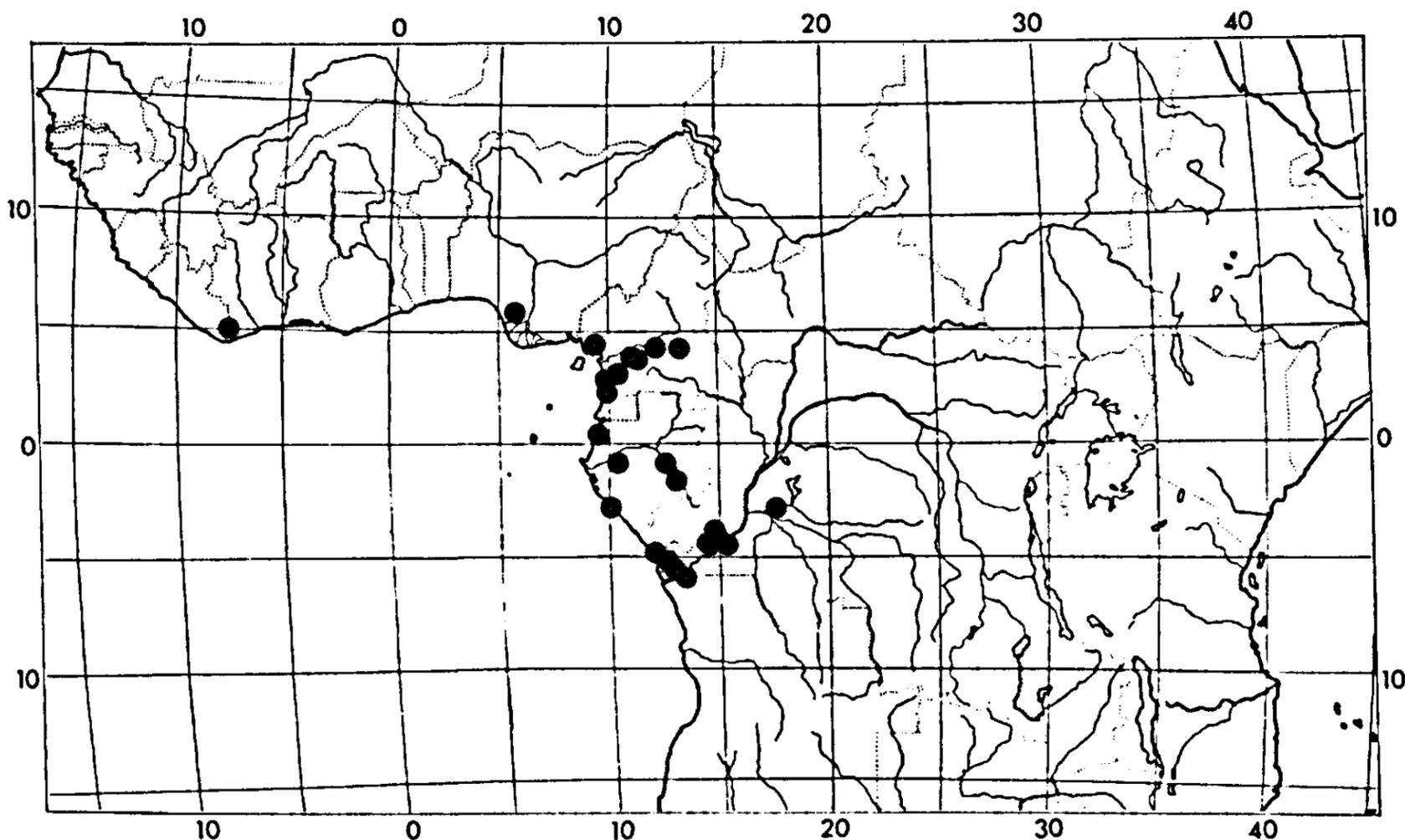
Fig. 12 Map 9

For literature, synonyms, and typification see under the varieties.

Diagnostic characters. Medium sized liana, lianescent shrub, or shrub. Lenticels dispersed, inconspicuous or not. Branchlets, stipules, and petioles hispid, hirsute, or tomentose, sometimes a mixture of short and long hairs present, glabrescent. Stipules narrowly triangular to subulate, (1)2–5(8) mm long. Leaves subsessile to shortly petiolate, usually with a cordate to subcordate base, gradually acuminate, glabrescent. Flowers in glomerules, with slender, rather long (up to 10 mm) pedicels of which the upper part is absent or inconspicuous. Sepals reflexed or suberect. Petals often curved inwards. Pistil 2–4-merous: ovary velutinous.

Description. Medium sized liana, lianescent shrub, or shrub. *Stems* and *branches* usually lenticellate, lenticels dispersed, inconspicuous or not, sometimes prickly pointed. *Branchlets* hispid, hirsute or tomentose, densely so or not, sometimes a mixture of short and long hairs present, soon glabrescent or only so with age: more or less the same indumentum present on stipules and petioles. *Stipules* narrowly triangular to subulate, often curved, (1)2–5(8) mm long, at most 1 mm wide at base. *Leaves:* petiole subterete, 0–3(5) mm long: blade obovate-elliptic, ovate-elliptic, or oblong, sometimes narrowly so, 2–4 times as long as wide, (3)7–16(22) × (1.5)2–7(9) cm, usually cordate or subcordate, sometimes rounded or cuneate at base, usually rather gradually acuminate at apex, the acumen 0.5–2(3) cm long, mostly acute or acutish, midrib and the (5)6–10(12) pairs of lateral nerves prominent or impressed above, usually prominent beneath, glands beneath only, usually rather inconspicuous: above usually with hairy midrib and with a few hairs on the main lateral nerves (young leaves may be entirely hairy), glabrescent, beneath hirsute, velutinous, or tomentose mainly on midrib and main lateral nerves or at least longer persistent on these parts. *Inflorescences* glomerate, up to ca 25-flowered, usually hairy as the branchlets: bracts and bracteoles minute, ovate-triangular, up to 2 mm long. *Pedicel* rather slender, (1.5)3–5(10) mm long, pubescent or puberulous, the upper part indistinct or absent. *Sepals* erect, spreading, or reflexed, narrowly ovate-elliptic to oblong, (1.5)2–2.5(3) × 0.5–1 mm, pubescent outside, inside glabrous or nearly so in lower part, puberulous in upper part. *Petals* suberect, or spreading at base and curved inwards in upper part, obovate-elliptic in outline, (1.5)2–3.5(4.5) mm long, (0.5)1–2(2.5) mm split, glabrous or





MAP 9. *D. dewevrei*

with a very few hairs outside just below split: lobes flat or slightly concave. *Stamens* curved as the petals or suberect, (1)2–4.5(5.5) mm long, glabrous. *Staminodes* subquadrate to oblong, less than 0.5 × 0.5 mm, glabrous. *Pistil* 2–3(4)-merous, up to 4(5.5) mm long: ovary velutinous: style 2–3(4)-lobed, glabrous or velutinous in the lower part. *Fruits* (only immature ones seen) subglobose and up to ca 1 cm in diam., or subovoid and apiculate, or beaked and up to 1.5 cm long, 1–3(4?)-seeded, tomentose, puberulous or villous.

Distribution: West Africa and Western Central Africa.

Ecology: Rain forest, gallery forest.

Key to the varieties

Petals 2.5–3.5(4.5) mm long, (1)1.5–2(2.5) mm split: stamens (2.5)3–4.5 (5.5) mm long, slightly longer than the petals: pistil 2.5–4(5.5) mm long.

..... var. **dewevrei**

Petals 1.5–2 mm long, 0.5–1 mm split: stamens 1–2 mm long, slightly shorter than the petals: pistil 1–2 mm long. var. **klaineanum**

FIG. 12. *D. dewevrei*: 1. leafy branch, $\frac{1}{2}\times$; 2. part of branchlet with stipules, $\frac{1}{2}\times$. (1. *Bos & Breteler* 7189; 2. *Breteler* 6433).

D. dewevrei var. *dewevrei*: 3. branch with immature fruits, $\frac{1}{2}\times$; 4. branchlet with immature fruits and leaf below, $\frac{1}{2}\times$; 5. flower, $6\times$; 6. part of flower with pistil, $6\times$; 7. 2-seeded fruit, $\frac{1}{2}\times$; 8. 1-seeded fruit, $\frac{1}{2}\times$. (3, 5–6. *Monteiro c.s.* 302; 4. *Leeuwenberg* 5437; 7–8. *Breteler* 6602).

D. dewevrei var. *klaineanum*: 9. 3-flowered inflorescence, $3\times$; 10. part of flower, $10\times$. (9–10. *Breteler* 7413).

D. dewevrei* De Wild. & Th. Dur. var. *dewevrei

D. dewevrei De Wildeman & Th. Durand, 1901: 41: Th. & H. Durand, 1909: 94; Engler, 1912-a: 587; De Wildeman, 1919: B25; Hauman, 1955: 350; 1958-a: 334; Breteler, 1973: XVI: Punt, 1975: 16, p.p.

Type: Zaïre, Mayumbe, Lemba, *Dewèvre* 359 (holotype: BR).

D. dewevrei De Wildeman & Th. Durand var. *donisii* Hauman, 1955: 349; 1958-a: 334. Type: Zaïre, Mayumbe, Luki, *Donis* 1989 (holotype: BR: isotype: EA).

D. obliquifolium Engler, 1902: 87, p.p.: Pellegrin, 1913: 642, quoad var. *obliquifolium*; De Wildeman, 1919: B55, p.p.; Breteler, 1973: XVI. Type (lecto, designated by Hauman, 1955: 350): Cameroun, Bipindi, *Zenker* 1978 (holotype: B†: lectotype: Z: isotypes: BM, E, G, GOET, L, M, W, WU).

D. obliquifolium Engler var. *mayumbensis* Pellegrin, 1913: 642. Type: Congo, Mayombe, *Thollon* 1348 (holotype: P).

D. micranthum Hauman, 1955: 346; 1958-a: 319; Breteler, 1973: XVI. Type: Zaïre, Mayumbe, Luki, *Maudoux* 270 (holotype: BR).

Specimens examined:

Cameroun. 17 km S. of Kribi, Campo Rd, *J. J. de Wilde* 8065 (WAG); 40 km N.W. of Yaoundé, *Leeuwenberg* 5437 (WAG); Essam, *Letouzey* 1102 (P); Bipindi, *Zenker* 1978 (BM, E, G, GOET, L, M, W, WU, Z, type of *D. obliquifolium*): 3741 (BM, BR, COI, E, GOET, K, L, M, MO, P, PRE, W, WAG, WU, Z); 3778 (BM, BR, COI, E, GOET, K, L, M, MO, P, PRE, W, WAG, WU, Z).

Gabon. 42 km S.E. of Lambaréné, *Breteler* 5715 (WAG); 4 km S.W. of Lastoursville, *Breteler* 6602 (WAG); near Libreville, *Courtet (Herb. d'Alleizette) s.n.* (L); *Klaine* 77 (BR, K, P, WAG): 380a (P, WAG): 709 (P): 1297 (P): 1361 (P, WAG); 1944 (BM, LE, P): 1962 (BM, K, LE, P): 2765 (K, P): 3353 (BR, K, P, WAG).

Congo. Near Brazzaville, *Courtet (Herb. d'Alleizette) s.n.* (L); near Pointe Noire, road to Cabinda, *Farron* 4804 (P): 4806 (P): Houilou (Niari), *Thollon* 1348 (P, type of *D. obliquifolium* var. *mayumbensis*).

Zaïre. Kinshasa, *Carrington* 87 (WAG); Luki, *Compère* 225 (BR); Lemba, *Dewèvre* 359 (BR, type); Luki, *Donis* 1989 (BR, EA, type of *D. dewevrei* var. *donisii*): Nioki, *Flamigni* 6143 B (BR); Luki, *Maudoux* 270 (BR, type of *D. micranthum*).

Angola. Noqui Rd., *Dacremont* 213 (BM, BR, COI, LISU); Cabinda, Buco Zau, *Monteiro, Santos & Murta* 302 (BM, LISC).

Notes. ENGLER based *D. obliquifolium* on two collections: *Zenker* 1978 and *Dewèvre* 1143 C. The first one fits ENGLER's description and has been designated lectotype by HAUMAN. The second one represents *D. lujaei* De Wild. & Th. Dur.

When publishing *D. dewevrei* var. *donisii*, HAUMAN observed already that his variety is intermediate between *D. dewevrei* and *D. obliquifolium*. At present several specimens (e.g. *Farron* 4804, 4806; *Klaine* 1297; *Breteler* 6602; *Leeuwenberg* 5437) can be found, which link the type specimens of both species. Therefore *D. obliquifolium* is reduced into synonymy of *D. dewevrei* var. *dewevrei*.

D. obliquifolium var. *mayumbensis* is based by PELLEGRIN on the 2-locular

ovary and the cuneate leaf base of the type. Throughout *D. dewevrei* var. *dewevrei* specimens with 2-locular ovaries occur, but usually the same specimens also have flowers with 3-locular ovaries as well, as in *Thollon 1348*, the type of var. *mayumbensis*. The cuneate leaf base is well linked by *Klaine 3353* and *Klaine 2765* with the more common cordate leafbase.

The type material of *D. micranthum* is conspecific with *Thollon 1348* that also shows the small, glabrous leaves which are rather characteristic for *D. micranthum*.

Klaine 2161 is the only specimen cited by PELLEGRIN (1913: 642) under *D. dewevrei*. This number, however, does not belong to this species, but may represent a new species with close affinities to *D. hispidum* (Oliv.)Baill.

The few fruiting specimens collected show that the fruit shape is rather variable in *D. dewevrei* var. *dewevrei*, from subglobose (*Leeuwenberg 5437*; *Zenker 3778*) to apiculate (*Breteler 6602*) to beaked (*Monteiro c.s. 302*). That in the same taxon different fruit shapes occur is also seen in *D. cymulosum*, *D. filicaule*, and *D. mundense*.

D. dewevrei* De Wild. & Th. Dur. var. *klaineanum* (Pellegr.)Bret., *comb.nov.

Basionym: *D. obliquifolium* Engler var. *klaineana* Pellegrin, 1913: 642.

Type: Gabon, Mont Bouet near Libreville, *Klaine 210* (holotype: P; isotypes: LE, WAG).

Specimens examined:

Ivory Coast. 17 km N. of Grabo, Tai Rd., *Breteler 7413* (WAG).

Gabon. Mont Bouet near Libreville, *Klaine 210* (LE, P, WAG, type): near Libreville, *Klaine 380* (P).

Notes. This variety is separated from *D. dewevrei* var. *dewevrei* by its smaller flowers only (see also under *D. crassifolium* var. *integrum*). Recent collections made in western Ivory Coast may indicate a disjunct area for the variety *klaineanum*, or rather that the area in between is still very insufficiently known.

The following specimens lack the necessary elements to identify them as belonging to one of the two varieties.

Ivory Coast. 17 km N. of Grabo, Tai Rd., *Breteler 7410* (WAG).

Nigeria. Bendel State, near Sapoba, Sapoba F.R., *Leeuwenberg 11266* (WAG).

Cameroun. Km 10 Kribi-Lolodorf, *Bos 4646* (WAG): 13 km from Kribi, S. of Ebolowa Rd., *Bos 5075* (WAG): Kribi, *Bos 5435* (WAG): Km 16 Kribi-Ebolowa, *Bos 5621* (WAG): Elephant Mt., S.E. of Kribi, *Bos 5776* (WAG): near Yaoundé, Akouandoué Mt., *Bos 6892* (WAG): Campo, *Bos 7039* (WAG): near Kribi, *Bos & Breteler 7189* (WAG): Km 26 Kribi-Campo, *Bos & Breteler 7219* (WAG): Km 30 Kribi-Campo, *Bos & Breteler 7229* (WAG): Elephant Mt., S.E. of Kribi, *Bos & Breteler 7241* (WAG): *7245* (WAG): Km 7 Kribi-Ebolo-

wa, *Bos & Breteler 7254* (WAG); Km 44 Kribi-Campo, *Bos & Breteler 7290* (WAG): 7291 (WAG): 7310 (WAG): 28 km S.W. of Bertoua, Dimako, *Breteler 1734* (WAG): km 30 Kumba-Victoria, *Leeuwenberg 10608* (WAG).

Gabon. Gamba, *Breteler & Van Raalte 5637* (WAG); Km 23 Moanda-Franceville, *Breteler 6433* (WAG); Km 23 Moanda-Bakoumba, *Breteler 6511* (WAG): 4 km S.W. of Lastoursville, *Breteler 6555* (WAG).

Congo. Kizoua, Kingoué-Mayama Rd., *Bouquet 848* (P): Pays Balali, near Renéville, *Chevalier 27551* (P).

Zaire. Boma, Luki, *Toussaint 2434* (BR, K): Boma, *Wagemans 1373* (BR, K, P).

D. dewildei Bret.. *sp.nov.*

Fig. 13 Map 10

Liana ramis ramulisque cortice brunneo vel nigro obtecti glabris vel cito glabrescentibus. Stipulae mox deciduae. Petiolus (5)8–13(20) mm longus, glaber vel fere glaber. Folia glabra vel nervis costaque sparse appresse-puberulis. costa plerumque supra impressa. Inflorescentia 5–25-florifera, distincta 1–4 × ramificata, sessilis vel breviter pedunculata. Sepala, petala, stamina pistillumque subaequilonga. Ovarium 3-loculare, velutinum. Fructus magnus, prominenter reticulatus, usque 5 cm longus 3.5 cm diametro.

Type: Cameroun, N’Koumvone, km 14 Ebolowa-Ambam, *J. J. de Wilde 8493* (holotype: WAG).

Diagnostic characters. Liana. Branches and branchlets with a brown to black bark, glabrous or soon glabrescent. Stipules early caducous. Petiole (5)8–13(20) mm long, glabrous or nearly so. Leaves glabrous or sparsely appressed-puberulous on midrib and main lateral nerves, the midrib usually impressed above. Inflorescences 5–25-flowered, distinctly 1–4 times branched, sessile or shortly pedunculate. Sepals, petals, stamens, and pistil subequal in length: ovary 3-locular, velutinous. Fruit large, prominently reticulate, up to 5 cm long and 3.5 cm in diam.

Description. Liana up to 60 m long. *Branches* brown to black, glabrous or nearly so: lenticels small, inconspicuous or not. *Branchlets* dark brown-black, appressed-puberulous when young, soon glabrescent, lenticels small. *Stipules* early caducous, ovate-triangular, 3–5 mm long, appressed-hairy to tomentellous outside, inside sparsely puberulous. *Leaves*: petiole slender, subterete, grooved above. (5)8–13(20) mm long, appressed-puberulous and glabrescent to glabrous; blade papery-coriaceous, obovate-elliptic, 1.5–2(3) times as long as wide. 8–13(18) × 4–7(10) cm, obtuse-truncate to cuneate at base, sometimes obliquely so, the leaf margin decurrent into petiole, obtuse-apiculate to acuminate at apex, the acumen up to 1 cm long: main lateral nerves 4–7 pairs, prominent beneath, the midrib usually impressed above, at least in the lower part: both sides glabrous or sparsely appressed-puberulous on midrib and main lateral nerves: glands both sides, rather small, prominent or impressed. *Inflorescences* rather small, 5–25-flowered, clearly 1–4 times

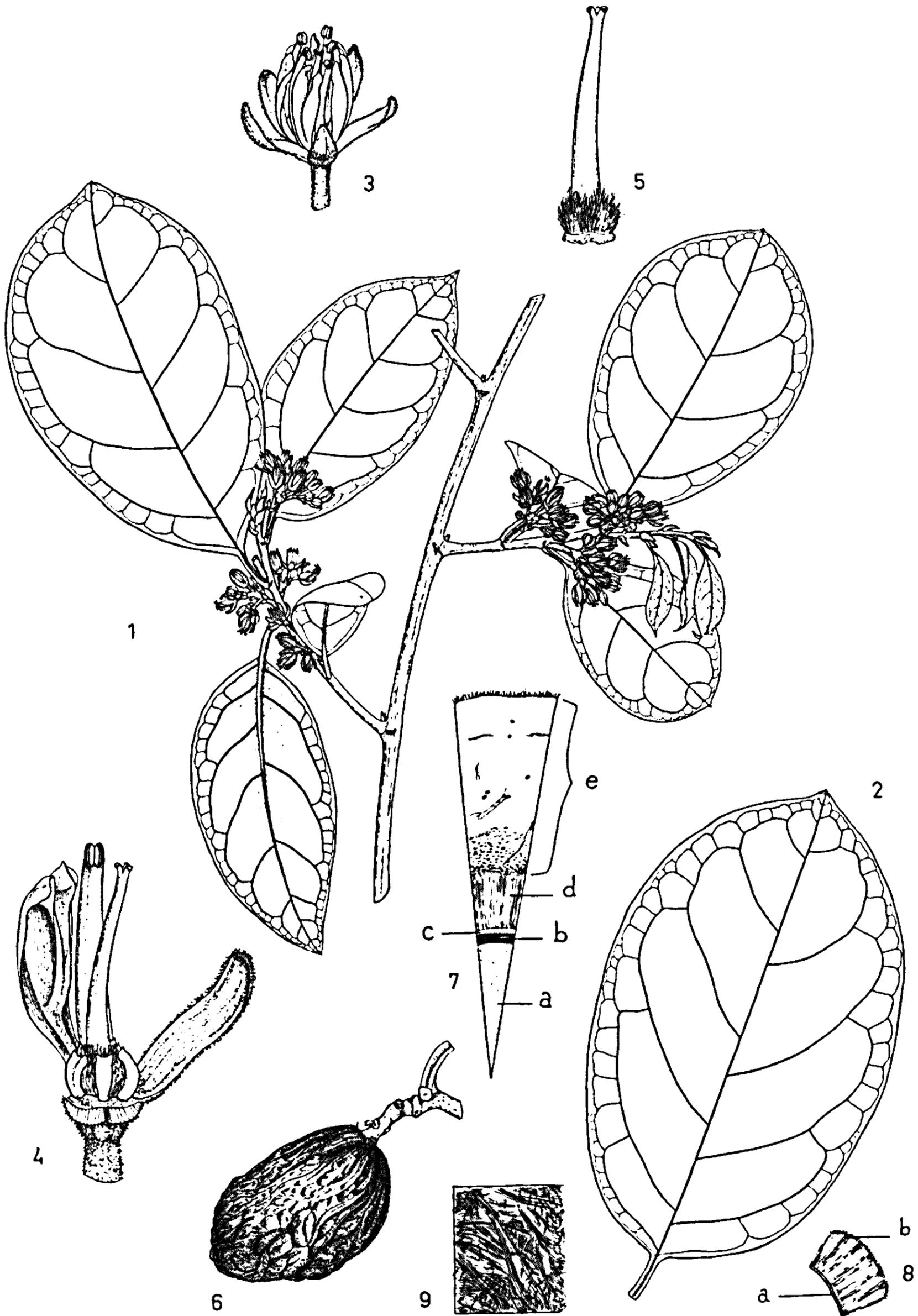


FIG. 13. *D. dewildei*: 1. flowering branch, $\frac{1}{2}\times$: 2. large leaf, $\frac{1}{2}\times$: 3. flower, $3\times$: 4. flower partly, $6\times$: 5. pistil, $6\times$: 6. fruit, $\frac{1}{2}\times$: 7. fruit segment, $4\frac{1}{2}\times$ (a = cotyledon: b = testa: c = endocarp: d = mesocarp: e = exocarp): 8. detail of fruitwall of mature fruit, $3\times$ (a = endocarp: b = mesocarp): 9. detail of inner surface of endocarp, $4\frac{1}{2}\times$. (1-5. De Wilde 8493: 6, 8-9. De Wilde 8269 A: 7. De Wilde 7751).

branched, sometimes several together on a short, leafless, axillary shoot, sessile or with a peduncle up to 0.5 cm long, sparsely puberulous. Bracts and bracteoles triangular, 1–2 mm long, puberulous-tomentellous. *Pedice* 3–4 mm long, glabrous to sparsely puberulous-tomentellous, the upper part up to 0.5 mm long. *Sepals* erect to slightly spreading, ovate-oblong, 2.5–4.5 × 1–2 mm, concave, top round to acutish, puberulous-tomentellous outside, slightly so to glabrous inside. *Petals* suberect, ca free at base, 3–4.5 mm long, 0.5–1.5 mm split, glabrous, lobes concave. *Stamens* erect to slightly curved, 3–5 mm long, glabrous. *Staminodes* obovate-oblong, rather thick, up to 1 × 0.5 mm, truncate-emarginate at apex. *Pistil* 3-merous, 3–6 mm long: ovary velutinous: style glabrous, lobes at most 0.5 mm long. *Fruits* ellipsoid to obovoid (1-seeded fruits), 3.5–5 cm long, 2.5–3.5 cm in diam.: exocarp prominently reticulate, densely shortly velutinous, up to ca 8 mm thick, firm: mesocarp juicy, adherent to endocarp, ca 2 mm thick, consisting of an erect, dense palisade of hairs: endocarp rather thin, coriaceous, glabrous inside, or with a few subappressed hairs. *Seed* sub-obovoid, slightly laterally compressed, up to 3.5 cm long, 2 cm broad, and 1.5 cm thick: seedcoat brown, smooth, glabrous.

Seedling: epicotyle ca 7 cm long, glabrous or nearly so, first leaves opposite, smaller than the subsequent ones, sparsely appressed-puberulous.

Distribution: South-West Cameroun, Eastern Zaïre.

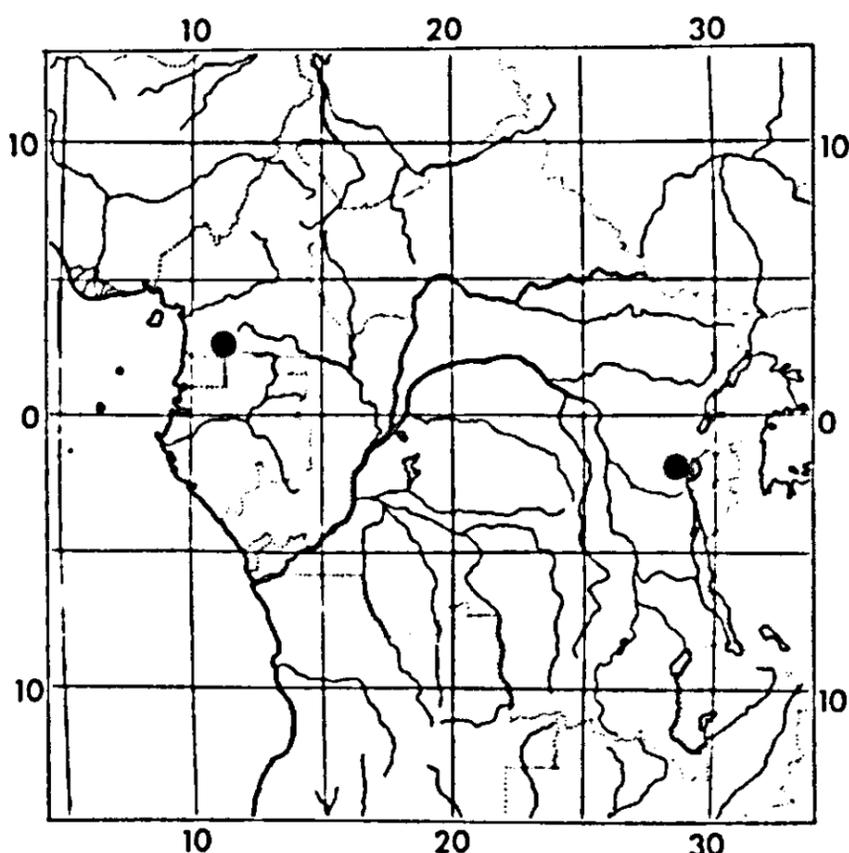
Ecology: Rain forest.

Specimens examined:

Cameroun. N’Koumvone, km 14 Ebolowa-Ambam, *J. J. de Wilde* 7751 (WAG); 8154 (WAG); 8269 A (WAG, collected from the same liana as the type); 8493 (WAG, type).

Zaïre. Kivu, km 110 Kavumu-Walikale, *Troupin* 3981 (BR, K, WAG).

Cult. Wageningen (seedling), *Breteler* 7530 (WAG).



MAP 10. *D. dewildei*

Notes. By its leaf shape, long petioles, and inflorescence this species is most closely related to *D. madagascariense* Poir. In that species, however, petals, stamens, and pistil are much longer than the sepals. Moreover, *D. dewildei* has much larger fruits. By its black drying leaves *D. dewildei* might be confused with *D. choristilum*. The latter, however, has a lanate indumentum on the ovary.

The flowers of *D. dewildei* have been reported as 'conspicuously sweet-fragrant' (*J. J. de Wilde* 8493).

From a seedling grown from *J. J. de Wilde* 8269 A, roottips were fixed and investigated by Mr. J. C. ARENDS. The somatic chromosome number proved to be $2n = 24$.

***D. dictyospermum* Bret.**

Fig. 14 Map 11

D. dictyospermum Breteler, 1970: 7: 1973: 98, XVI: Punt, 1975: 29.

Type: Ivory Coast, Forêt du Banco, 3 km W. of Abidjan, *Oldeman* 962 (holotype: WAG: isotypes: BR, FHI, G, K, P, SRGH).

Diagnostic characters. Liana or lianescent shrub. Branches solid, glabrous. Branchlets sparsely short-hairy, glabrescent. Stipules rather early caducous, subulate, 1–4 mm long. Leaves narrowly elliptic-obovate, (4)10–15 × (2)3–5 cm, glabrous or nearly so: petiole 2–5(7) mm long. Inflorescence rather loose, usually grouped on short, leafless, axillary shoots, very slender stalked, short-hairy. Pedicel slender, up to 8 mm long. Sepals reflexed. Petals from erect to reflexed, 3–4 mm long, 1–2 mm split. Ovary lanate. Fruit usually obovoid, 2.5–4 cm long, apiculate or not, smooth, glabrous, orange at maturity.

Description. Liana, lianescent shrub, or shrub. *Branches* solid, also the orthotropic ones, glabrous, with scattered lenticels: bark rather soon shallowly, longitudinally fissured, finally peeling off in thin curly flakes. *Branchlets* mostly glossy, shortly and sparsely appressed-pilose when young, soon glabrescent. *Stipules* often soon deciduous, subulate, 1–4 mm long, sparsely appressed-pilose. *Leaves*: petiole subterete to semiterete, slightly canaliculate above, 2–5(7) mm long, sparsely appressed-pilose, glabrescent: blade papery, usually glossy when fresh, drying dark brown to black, usually narrowly elliptic to narrowly obovate, (4)10–15 × (2)3–5 cm, tapering to a narrow, rounded or cuneate base, acuminate at apex, the acumen acute, mucronate or obtuse, 0.5–1.5 cm long, midrib impressed above, prominent below, with (4)5–7 main lateral nerves on each side, glabrous or with a few, scattered hairs on the margin, the midrib both sides, and the main lateral nerves below, glandless or with a few, small, inconspicuous, scattered glands below. *Inflorescences* usually grouped on a usually short, leafless, axillary shoot, loose, thin-branched, fragile, 1–2 × distinctly branched, up to ca 20-flowered, puberulous; peduncle

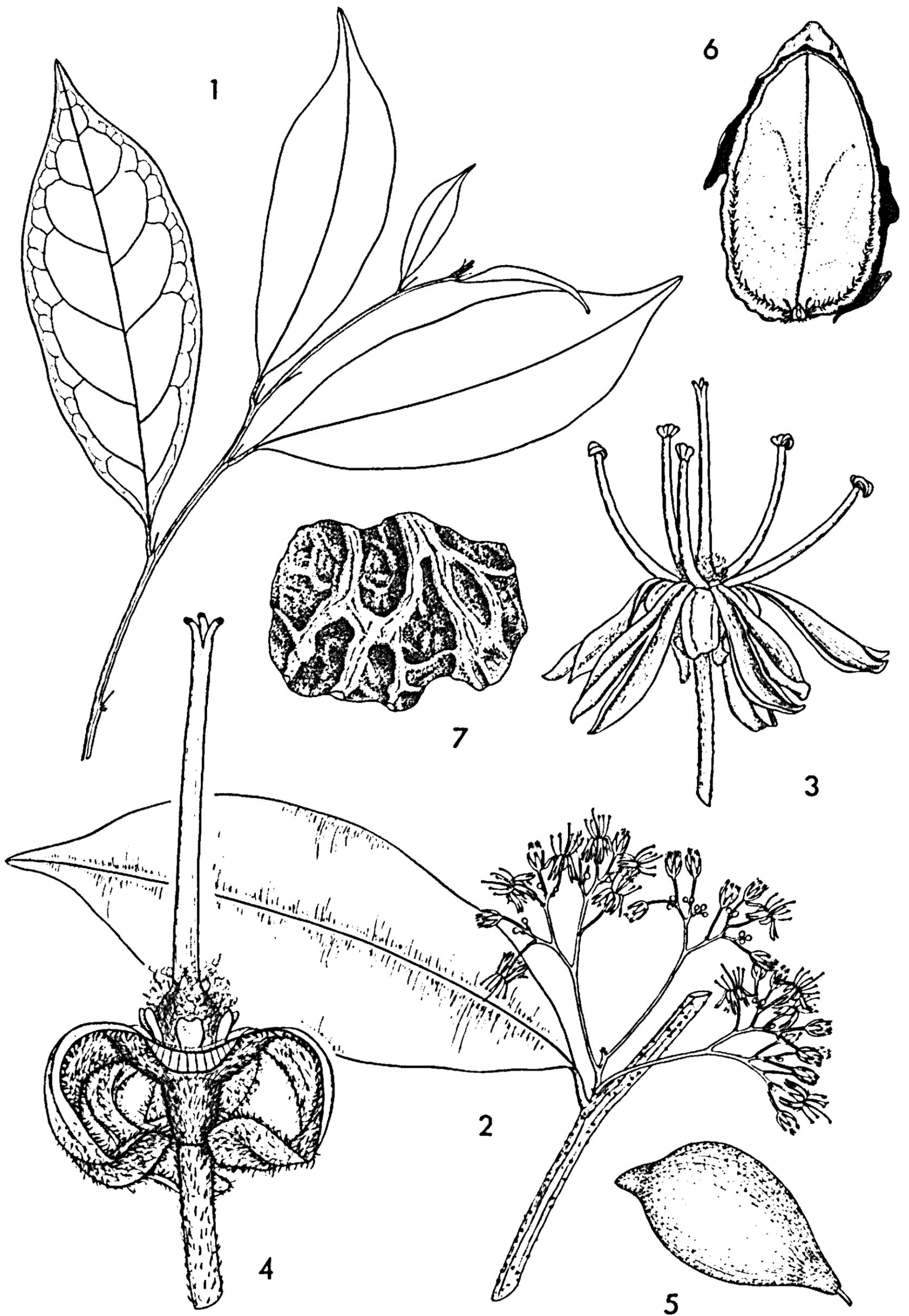


FIG. 14. *D. dictyospermum*: 1. branchlet with stipules, $\frac{5}{6} \times$; 2. part of flowering branch, $\frac{5}{6} \times$; 3. flower, $7 \times$; 4. part of flower, $13 \times$; 5. fruit, $\frac{5}{6} \times$; 6. cotyledon inner surface, $2\frac{1}{2} \times$; 7. part of testa from outside, $5 \times$. (1-4. Oldeman 962; 5-7. Leeuwenberg 1863).

very slender. (0.5)1–2.5 cm long: bracts and bracteoles small. subdeltoid to subulate. up to at most 1 mm long. *Pedicel* slender. up to 8 mm long. the upper part ca. 0.5 mm long. tomentose to almost glabrous. *Sepals* reflexed. free or shortly united at base. ovate-elliptic to oblong. 2–3.5 mm long, ca 1 mm wide. outside and on top inside appressed-puberulous to tomentellous. *Petals* erect. spreading. or reflexed, at base shortly adnate to filaments. narrowly obovate to spatulate in outline. 3–4 mm long. 1–2 mm split. glabrous or with a single hair between the lobes outside. *Stamens* 3–4 mm long. glabrous: anthers ca 0.5 mm long. connective not very prominent. *Staminodes* rather flat. quadrate to oblong. at most 0.3 × 0.2 mm. obtuse to emarginate at apex. *Pistil* 3-merous. 3.5–5 mm long: style glabrous or nearly so. with 3 up to 1 mm long lobes: ovary lanate. sometimes sparsely so. *Fruits* usually obovoid. sometimes ellipsoid. 2.5–4 cm long. 2–2.5 cm in diam.. 1–2(3?)-seeded. apiculate or not. smooth. glabrous. yellow to orange at maturity: exocarp ca 3 mm thick: mesocarp ca 2 mm thick. sticking to endocarp. consisting of a dense. erect pallisade of juicy hairs: endocarp coriaceous-pergamentaceous. strongly fibrous. glabrous inside. *Seed* ovoid in outline. 1.5–2 cm long. 1–1.5 cm in diam.. truncate at base. acutish at apex: testa glabrous. firmly veined. with a small hole next to the hilum, corresponding with a hole in the endocarp.

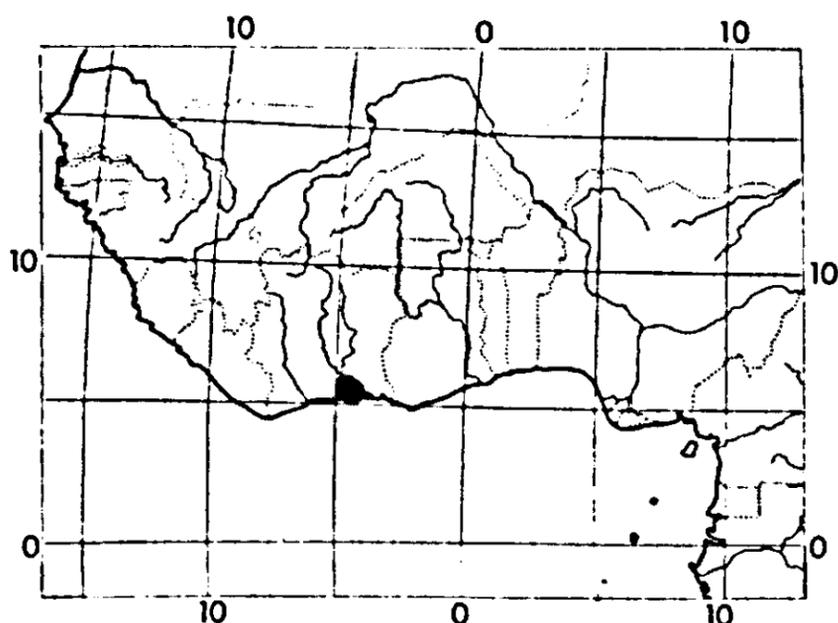
Seedling with a firm taproot: the epicotyle 4–7 cm long. bearing some cataphylls. appressed-pubescent: the leaves rather crowded. the first ones alternate. broadly elliptic. the subsequent ones rather rapidly increasing in size and becoming more narrowly obovate-elliptic.

Distribution: Ivory Coast.

Ecology: Rain forest.

Specimens examined:

Ivory Coast. 3 km W. of Abidjan, Forêt du Banco, *Aké Assi* 1688 (WAG): *de Koning* 2517 (WAG): 2618 (WAG): 2723 (WAG): 2735 (WAG): 2814 (WAG): 2838 (WAG): 3379 (WAG): 3406 (WAG): 3451 (WAG): 4766 (WAG): 5362 (WAG): 5508 (WAG): 6088 (WAG): 6163 (WAG): 6164 (WAG): 7011 (WAG): 15 km N.W. of Abidjan, Forêt de l'An-



MAP 11. *D. dictyospermum*

guédédou, *J. J. de Wilde* 296 (WAG); ca 3 km W. of Abidjan, Forêt du Banco, *J. J. de Wilde* 537 (WAG); *J. J. de Wilde & Voorhoeve* 3199 (FI, K, WAG); *de Wit* 8287 (WAG); 15 km N.W. of Abidjan, Forêt de l'Anguédédou, *Leeuwenberg* 1863 (K, WAG); ca 3 km W. of Abidjan, Forêt du Banco, *Nozeran s.n.* (MPU); *Oldeman* 962 (BR, FHI, G, K, P, SRHG, WAG, type); Forêt de l'Anguédédou, *Thijssen* 304 (WAG); Adiopodoumé, *Versteegh & den Outer* 720 (WAG).

Cult. Ivory Coast (seedlings). Adiopodoumé, *de Koning* 3255 (WAG): 3587 (WAG): 3593 (WAG): 3690 (WAG): 3758 (WAG): 5749 (WAG): 5976 (WAG): 6398 (WAG).

Notes: For relationship see under *D. filicaule*.

Fixed roottips from *de Koning* 3690 were analyzed by Mr. J. C. ARENDS (slide nr. 1–50). The somatic chromosome number proved to be $2n = 24$.

D. discolor (Bak.)Engl. = *D. leucosia* (Spreng.)Engl.

D. discolor (Baker)Engler. 1896-a: 348: Engler & Krause. 1931: 6.

Basionym: *Chailletia discolor* Baker. 1883: 119. Type: Madagascar. forest of Alamazaotra. *Baron* 1403 (holotype: K: isotype: BM).

Note. DESCOINGS (1960: 87) reduced BAKER's species into synonymy of *D. leucosia*. His decision is fully supported by the present author.

D. divaricatum De Wild. = *D. brazzae* Pellegr.

For details see under *D. brazzae* (BRETILER, 1973: 110).

D. dodoense Engl. = *D. madagascariense* Poir.

D. dodoense Engler, 1912-a: 591; 1915: 848; De Wildeman, 1919: B28; Engler & Krause, 1931: 8; Breteler, 1973: XVIII. Type: Cameroun, near Dodo, *Ledermann* 2859 (holotype: B†; lectotype: BM).

Note. As in the case of *D. cinnatum*, a fragment of the holotype from Berlin has been designated lectotype. Examination of this fragment and of ENGLER's original diagnosis, leaves no doubt as regards the true identity of *D. dodoense*. It represents a form of *D. madagascariense* with tree habit, formerly known in West Africa as *D. guineense* (DC.)Keay.

D. dummeri Moss = *Tapura fischeri* Engl.

D. dummeri Moss. 1928: 123. Type: Uganda. Mabira. forest edge at Mulange. *Dummer* 4469 (holotype: BM).

Note. HAUMAN (1958-a: 347) recognized the type material as belonging in *Tapura fischeri*. His conclusion is fully supported.

D. dundusanense De Wild. = **D. madagascariense** Poir.

D. dundusanense De Wildeman, 1919: B28; Hauman, 1958-a: 306; Breteler, 1973: XVIII. Type: Zaïre. Dundusana. *Mortehan 55* (lectotype: BR).

Note. Of the two syntypes mentioned by DE WILDEMAN. HAUMAN designated *Mortehan 55* as lectotype.

The original author classified his species correctly i.e. near *D. floribundum*. The type of *D. dundusanense* represents a form of *D. madagascariense* which before had been described as *D. floribundum*.

D. dusenii Engl. = **D. affine** (Planch. ex Bth.)Bret.

For details see under *D. affine* (BRETELER, 1973: 48).

D. echinulatum Exell = **D. staudtii** Engl.

D. echinulatum Exell, 1927: 68; Exell & Mendonça, 1951-b: 329; Breteler, 1973: XX; Punt, 1975: 23. Type: Angola, Mayumbe (Cabinda), Belize, *Gossweiler 7102* (holotype: BM; isotypes: BR, COI, K, LISU).

Note. In the original publication of *D. echinulatum*, the author noted that his species was probably nearest to *D. staudtii*, but could be distinguished 'by the fruit, by the quite glabrous leaves, and by the quite shorter pedicels'. The specific character(s) of the fruit by which *D. echinulatum* could be distinguished were not mentioned, but the fruit characters of the type material do not differ from those of *D. staudtii*. The other distinguishing characters, i.e. the glabrous leaves and the shorter pedicels, are rather variable in *D. staudtii* and do not justify the maintenance of *D. echinulatum* as a distinct taxon.

D. edule Engl.

Fig. 15 Map 12

D. edule Engler, 1911: 249; 1912-a: 571; 1915: 844; De Wildeman, 1919: B29; Moss, 1928: 121; Engler & Krause, 1931: 7; Brenan & Greenway, 1949: 130; Torre, 1963: 321; Verdcourt & Trump, 1970: 65; Breteler, 1973: 4, XVI; Punt, 1975: 22–23.

Type: Tanzania, Noto-Plateau, *Busse 2928* (holotype: B†; lectotype: BR; isotypes: BM, EA, G, WAG).

guédédou, *J. J. de Wilde* 296 (WAG); ca 3 km W. of Abidjan, Forêt du Banco, *J. J. de Wilde* 537 (WAG); *J. J. de Wilde & Voorhoeve* 3199 (FI, K, WAG); *de Wit* 8287 (WAG); 15 km N.W. of Abidjan, Forêt de l'Anguédédou, *Leeuwenberg* 1863 (K, WAG); ca 3 km W. of Abidjan, Forêt du Banco, *Nozeran s.n.* (MPU); *Oldeman* 962 (BR, FHI, G, K, P, SRHG, WAG, type); Forêt de l'Anguédédou, *Thijssen* 304 (WAG); Adiopodoumé, *Versteegh & den Outer* 720 (WAG).

Cult. Ivory Coast (seedlings). Adiopodoumé, *de Koning* 3255 (WAG): 3587 (WAG): 3593 (WAG): 3690 (WAG): 3758 (WAG): 5749 (WAG): 5976 (WAG): 6398 (WAG).

Notes: For relationship see under *D. filicaule*.

Fixed roottips from *de Koning* 3690 were analyzed by Mr. J. C. ARENDS (slide nr. 1–50). The somatic chromosome number proved to be $2n = 24$.

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D. discolor (Baker)Engler. 1896-a: 348: Engler & Krause. 1931: 6.

Basionym: *Chailletia discolor* Baker. 1883: 119. Type: Madagascar. forest of Alamazaotra. *Baron* 1403 (holotype: K: isotype: BM).

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D. dodoense Engler, 1912-a: 591; 1915: 848; De Wildeman, 1919: B28; Engler & Krause, 1931: 8; Breteler, 1973: XVIII. Type: Cameroun, near Dodo, *Ledermann* 2859 (holotype: B†; lectotype: BM).

Note. As in the case of *D. cinnatum*, a fragment of the holotype from Berlin has been designated lectotype. Examination of this fragment and of ENGLER's original diagnosis. leaves no doubt as regards the true identity of *D. dodoense*. It represents a form of *D. madagascariense* with tree habit. formerly known in West Africa as *D. guineense* (DC.)Keay.

D. dummeri Moss = *Tapura fischeri* Engl.

D. dummeri Moss. 1928: 123. Type: Uganda. Mabira. forest edge at Mulange. *Dummer* 4469 (holotype: BM).

Note. HAUMAN (1958-a: 347) recognized the type material as belonging in *Tapura fischeri*. His conclusion is fully supported.

D. dundusanense De Wild. = **D. madagascariense** Poir.

D. dundusanense De Wildeman, 1919: B28; Hauman, 1958-a: 306; Breteler, 1973: XVIII. Type: Zaire. Dundusana. *Mortehan 55* (lectotype: BR).

Note. Of the two syntypes mentioned by DE WILDEMAN, HAUMAN designated *Mortehan 55* as lectotype.

The original author classified his species correctly i.e. near *D. floribundum*. The type of *D. dundusanense* represents a form of *D. madagascariense* which before had been described as *D. floribundum*.

D. dusenii Engl. = **D. affine** (Planch. ex Bth.)Bret.

For details see under *D. affine* (BRETELER, 1973: 48).

D. echinulatum Exell = **D. staudtii** Engl.

D. echinulatum Exell, 1927: 68; Exell & Mendonça, 1951-b: 329; Breteler, 1973: XX; Punt, 1975: 23. Type: Angola, Mayumbe (Cabinda), Belize, *Gossweiler 7102* (holotype: BM; isotypes: BR, COI, K, LISU).

Note. In the original publication of *D. echinulatum*, the author noted that his species was probably nearest to *D. staudtii*, but could be distinguished 'by the fruit, by the quite glabrous leaves, and by the quite shorter pedicels'. The specific character(s) of the fruit by which *D. echinulatum* could be distinguished were not mentioned, but the fruit characters of the type material do not differ from those of *D. staudtii*. The other distinguishing characters, i.e. the glabrous leaves and the shorter pedicels, are rather variable in *D. staudtii* and do not justify the maintenance of *D. echinulatum* as a distinct taxon.

D. edule Engl.

Fig. 15 Map 12

D. edule Engler, 1911: 249; 1912-a: 571; 1915: 844; De Wildeman, 1919: B29; Moss, 1928: 121; Engler & Krause, 1931: 7; Brenan & Greenway, 1949: 130; Torre, 1963: 321; Verdcourt & Trump, 1970: 65; Breteler, 1973: 4, XVI; Punt, 1975: 22–23.

Type: Tanzania, Noto-Plateau, *Busse 2928* (holotype: B†; lectotype: BR; isotypes: BM, EA, G, WAG).

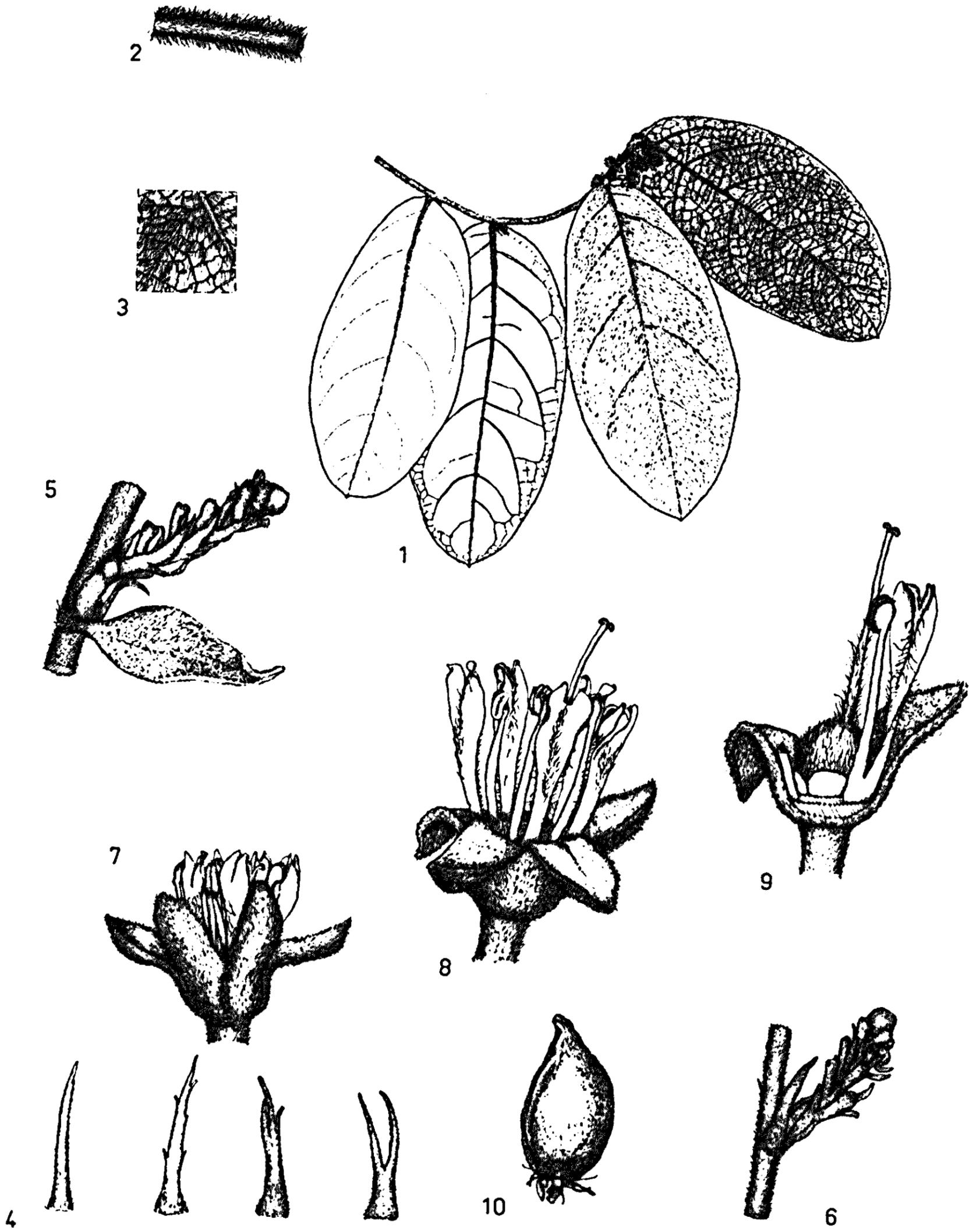
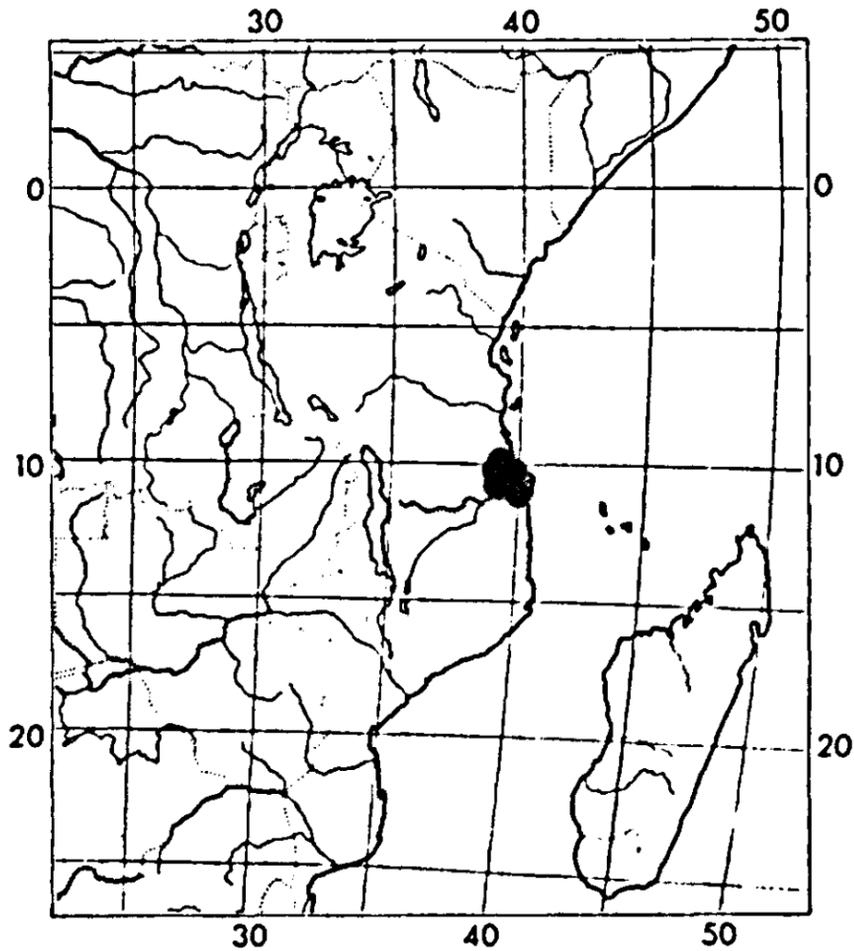


FIG. 15. *D. edule*: 1. flowering branchlet, $\frac{1}{2} \times$; 2. detail of branchlet with indumentum, $2 \times$; 3. detail lower leaf surface, $2 \times$; 4. stipule variation, $2 \times$; 5-6. inflorescence, $2 \times$; 7-8. flowers, $6 \times$; 9. flowerpart, $6 \times$; 10. fruit, $1 \times$. (1-3. Busse 2928; 4-6 Gillman 1126; 7. Gillman 1367; 8-10. Schlieben 5195).

Diagnostic characters. Evergreen lianescent shrub or shrub. Branchlets with a golden-brown, dense indumentum. Stipules narrowly triangular to subulate, (2)4–8(10) mm long. Leaves shortly stalked, usually elliptic, the margin often somewhat revolute, 3–9(13) × (1.5)2–4(6) cm, usually with a cordate base and an apiculate to acute top, both sides with rather long, subappressed hairs. Inflorescence sessile or nearly so, usually few-flowered and glomerule like. Sepals from erect to reflexed, 2.5–3.5 mm long: petals erect, slightly longer than the sepals, 0.5 mm split, hairy or not: stamens as long as the petals or slightly shorter, glabrous: pistil 2-merous, often longer than the petals, ovary with short, stiff hairs. Fruit velutinous.

Description. Evergreen lianescent shrub or shrub. *Branches* dark-brown to black, glabrous or glabrescent, with small, rather inconspicuous lenticels. *Branchlets*, stipules, and petioles densely, golden-brown-velutinous or hispidulous. *Stipules* narrowly triangular to subulate, entire, sometimes dentate or bifid to trifid, (2)4–8(10) mm long, rather long persistent, glabrescent. *Leaves*: petiole subterete, 2–4 mm long: blade elliptic, sometimes ovate or obovate, ca 2 times as long as wide, 3–9(13) × (1.5)2–4(6) cm, usually cordate, sometimes obtuse at base, apiculate or mucronate, sometimes shortly acuminate at apex, both sides with rather long subappressed hairs, often more densely so on midrib and main lateral nerves, glabrescent with age, lateral nerves 6–9 on each side of the midrib, subimpressed and rather obscure above, prominent beneath, glands, when present, few, rather inconspicuous, below only, mainly concentrated near base and near top, the leafmargin often somewhat revolute, especially so in lower half. *Inflorescence* a scorpioid cyme (see BRETELER, 1973: 22, fig. 3–1), but usually rather small and few-flowered and therefore not recognizable as such, sessile or nearly so, up to ca 20-flowered, densely velutinous to tomentose: peduncle up to 4 mm long: bracts and bracteoles narrowly triangular-subulate, 1–4 mm long. *Pedicel* up to ca 3 mm long, the upper part at most 0.5 mm long. *Sepals* from erect to reflexed, free or slightly united at base, oblong or nearly so, 2–3.5 × ca 1 mm, obtuse to acutish at top, tomentose outside, puberulous-tomentellous mainly on apical part inside. *Petals* erect, at base shortly adnate to filaments, spathulate in outline, 2.5–4.5 mm long, ca 0.5 mm split, glabrous or variously hairy below split one or both sides. *Stamens* erect, as long as the petals or slightly shorter, glabrous: anthers 0.5 mm long, with a prominent connective. *Staminodes* flat, subquadrate, up to 0.5 × 0.5 mm, usually forming a lobulate-crenate continuous ring around the ovary, glabrous. *Pistil* 2-merous, 2.5–5 mm long: style hairy in the lower part, shortly 2-lobed at top: ovary densely velutinous. *Fruits* 1–2-seeded, densely velutinous to tomentose, orange at maturity: 1-seeded fruits: subellipsoid, ca 2 cm long and 1 cm in diam.: endocarp coriaceous-pergamentaceous, fibrous, smooth, glossy, and glabrous inside.



MAP 12. *D. edule*

Distribution: S.E. Tanzania, N.E. Mozambique.

Ecology: Evergreen or deciduous thicket.

Specimens examined:

Tanzania. Noto-Plateau, *Busse 2928* (BM, BR, EA, G, WAG, type): 12 mls Newala-Kitangari, *Eggeling 6749* (EA, K, PRE): Lindi distr., Western slope of Rondo, *Gillett 17961* (K): Makonde Plateau, *Gillman 1033* (EA): Sudi, *Gillman 1126* (EA, K): Mingoyo, *Gillman 1367* (EA, K): Lindi distr., South side of Rondo Plateau, *Milne-Redhead & Taylor 7645* (EA, K): Lindi distr., 40 km W. of Lindi, *Milne-Redhead & Taylor 7649* (BR, K, LISC): 40 km W. of Lindi, Lutamba Lake, *Schlieben 5195* (B, BM, BR, G, K, LISC, M, P, PRE, Z).

Mozambique. Tongué, between Palma and Nangade, *Andrada 1365* (BR, COI, LISC, SRGH): Rovuma, *Kirk s.n.* (K): Km 16 Namana-Nangade, *Torre & Paiva 12054* (LISC).

Notes: It is not certain to which species *D. edule* is most closely related. PUNT placed it, together with *D. choristilum*, in his *D. choristilum* pollen type. Morphological characters, however, do not point towards close relationships between these two species. The present author's opinion is, that *D. edule* occupies a rather isolated position in the neighbourhood of *D. dewevrei*.

According to ENGLER (1911: 250; 1912-a: 571) the pericarp is eaten.

***D. eickii* Ruhl.**

Fig. 16 Map 13

D. eickii Ruhland, 1902: 80: Engler, 1912-a: 567: De Wildeman, 1919: B29; Moss, 1928: 129: Brenan & Greenway, 1949: 131: Verdcourt & Trump, 1970: 64: Breteler, 1973: 4, XVI: Punt, 1975: 29.

Type: Tanzania, Usambara, Kwai, *Eick 132* (holotype: B†: no isotypes present, see notes).



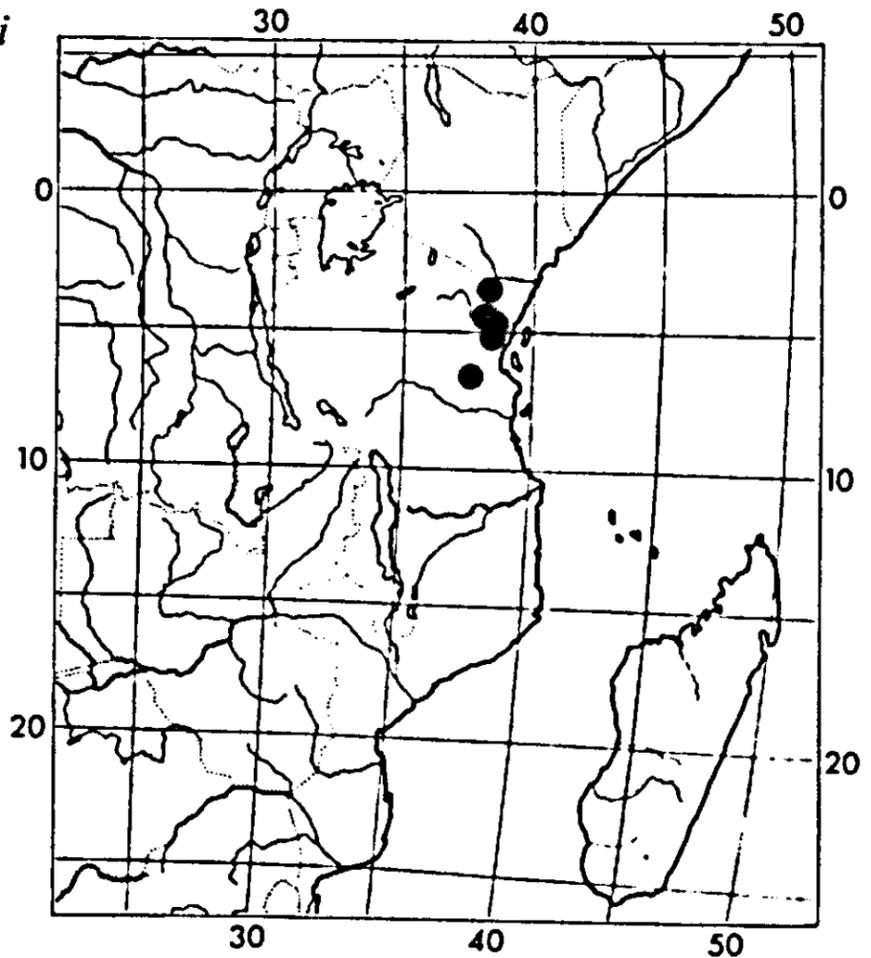
FIG. 16. *D. eickii*: 1-3. leaves seen from above, $\frac{1}{2}\times$; 4. part of branchlet with leaf base, axillary bud, and stipules, $4\times$; 5. flowering branchlet, $\frac{1}{2}\times$; 6. part of inflorescence, $2\times$; 7. flower, $6\times$; 8. part of flower, $6\times$; 9. detail of indumentum of sepals, $12\times$; 10. fruit, $1\times$. (1, 6-9. Breteler 7508; 2. Drummond & Hemsley 2591; 3. Drummond & Hemsley 1760; 4-5. Faden c.s. 71|21; 10. Schlieben 3179).

Neotype: Kenya, Sagala Hills near Voi, eastern slope near top, *Breteler 7508* (holotype: WAG).

Diagnostic characters. Liana, lianescent shrub, or shrub. Branches lenticellate, glabrous. Branchlets with brown, short hairs, usually soon glabrescent. Stipules usually early caducous, 1–3 mm long. Leaves elliptic, often narrowly so, 5–10(14) × (1.5)2–4(6) cm, glabrous or nearly so. Inflorescences usually shortly stalked, distinctly branched, brown-tomentellous. Sepals erect or slightly spreading, 2–3 × 1 mm, densely brown-tomentellous. Petals erect, as long as or slightly shorter than the sepals, 0.5–1.5 mm split, glabrous or nearly so. Stamens ca as long as the petals. Pistil usually 3-merous, as long as or shorter than the stamens, the ovary densely lanate. Fruits densely rusty-brown velutinous to tomentellous.

Description. Liana, lianescent shrub, or shrub. *Stem* and *branches* glabrous, usually with small lenticels, those on the orthotropic shoots often in rows. *Branchlets* sparsely to densely puberulous-tomentellous, usually soon glabrescent, the same indumentum present on stipules and petioles. *Stipules* usually soon deciduous, narrowly triangular, 1–3 mm long. *Leaves:* petiole semi-terete, grooved or canaliculate above, 1–5 mm long; blade elliptic, often narrowly so, sometimes ovate or obovate, 5–10(14) × (1.5)2–4(6) cm, obtuse to cuneate at base, gradually acuminate or acute at apex, the acumen obtuse, acute, or mucronate, 0.5–1(1.5) cm long, sparsely appressed-puberulous when young, mainly so on midrib and main lateral nerves, soon glabrescent, the midrib often impressed above, the (5)6–8(10) main lateral nerves on each side often hardly visible above, fairly prominent and often paler coloured beneath, glands, when present, few, small, usually inconspicuous, below only. *Inflorescences* usually shortly peduncled, 1–3 times distinctly branched, up to ca 30-flowered, brown-tomentellous: peduncle 0–4(9) mm long: bracts and bracteoles ovate-triangular, up to 1 mm long. *Pedicel* up to 3 mm long, the upper part very short or absent. *Sepals* erect to slightly spreading, free or shortly united at base, oblong or nearly so, 2–3 × 1–1.5 mm, top obtuse to acute, densely brown-tomentellous both sides or inside only so on apical part. *Petals* erect, at base shortly adnate to filaments, ca narrowly elliptic in outline, 1.5–2.5 mm long, 0.5–1.5 mm split, glabrous or partly short-hairy at base both sides or outside only. *Stamens* 1.5–2.5 mm long, glabrous; filaments often curved inwards: anthers ca 0.5 mm long with a prominent connective. *Staminodes* rather flat, subquadrate to transversely oblong, up to 0.4 × 0.7 mm, truncate to crenate-lobulate at top, glabrous or nearly so. *Pistil* (2)3-merous, 1–2 mm long: style glabrous, shortly (2)3-lobed at top: ovary densely lanate. *Fruits* obovoid-ellipsoid, up to ca 2.5 cm long and 1.5 cm in diam., densely rusty-brown-tomentellous to velutinous: immature fruits wrinkled-verrucose, obliquely and unilaterally developed, the true apex becoming lateral: endocarp pergamentaceous, densely subappressed-brown-hairy inside. *Seed* ovoid, ca 1.5 cm long, 1 cm in diam., with a brown thin seedcoat.

MAP 13. *D. eickii*



Distribution: S.E. Kenya, N.E. Tanzania.

Ecology: Montane forest, upland evergreen rainforest, mist forest, or heath vegetation, alt.: 1100–2200 m.

Specimens examined:

Kenya. Sagala Hills, near Voi, eastern slope near top, *Breteler* 7508 (WAG, type); Taita Hills, Ngangao, 5 mls N.N.E. of Ngerenyi, *Drummond & Hemsley* 4330 (EA, K); Sagala Hills, near Voi, eastern slope near highest point, *Faden, Evans, Msafari, & Smeenk* 71/21 (EA, K).

Tanzania. Uluguru Mts, Bondwa Hill, *Drummond & Hemsley* 1760 (B, BR, EA, K, SRGH); W. Usambaras, Mkuzi, 4 mls W. of Lushoto, *Drummond & Hemsley* 2067 (B, BR, EA, FI, K, SRGH, W); W. Usambaras, Shagai forest near Sunga, *Drummond & Hemsley* 2591 (B, BR, K, SRGH); E. Usambaras, Ngua, *Greenway* 2978 (EA, K); Uluguru Mts, Bondwa, *Harris, Faden, Pocs, P. & K. Csontos* 5079 (EA); N.W. Uluguru Mts, Morogoro distr., *Schlieben* 3179 (B, LISC).

Notes. The holotype of *D. eickii* was lost at Berlin and no isotype could be located. The fragment, consisting of a few leaves and an immature fruit, present at BM, represents *D. eickii* and originates from Berlin. There is, however, no annotation 'Type' nor any indication of the collector as was the case with *D. flaviflorum* (see p. 75) or with *D. flavovirens* (see p. 76). Therefore this fragment cannot be accepted as a lectotype and a neotype has been designated.

PUNT (l.c.) placed *D. eickii* close to *D. unguiculatum* Engl. and *D. tomentosum* Engl. in his *D. heudelotii* pollen type. However, in my opinion, *D. eickii* is closely related to *D. choristilum* sharing the usually dark-drying leaves, the type of inflorescence, the lanate indumentum of the ovary, and the pergamentaceous endocarp, which is hairy inside. They may be distinguished as follows:

Stipules 2–7(10) mm long: petiole 3–11(18) mm long, the blade (4)8–18(30) × (2)3–8(13) cm: stamens and pistil usually longer than the sepals, which are often reflexed. **D. choristilum**

Stipules 1–3 mm long: petiole 1–5 mm long, the blade 5–10(14) × (1.5)2–4 (6) cm: stamens and pistil at most as long as the sepals but usually shorter, the sepals never reflexed. **D. eickii**

D. eickii seems to be the only species confined to high altitudes, geographically well separated from the related *D. choristilum*.

D. ellipticum R.E. Fries = **D. bangii** (F. Didr.)Engl.

For details see under *D. bangii* (BRETELER, 1973: 70, 74).

D. fallax Ruhl. = **D. affine** (Planch. ex Bth.)Bret.

For details see under *D. affine* (BRETELER, 1973: 48).

D. ferrugineo-tomentosum Engl. = **D. angolense** Chod.

For details see under *D. angolense* (BRETELER, 1973: 60).

D. ferrugineum Engl. = **D. heudelotii** (Planch. ex Oliv.)Baill.

D. ferrugineum Engler, 1896-b: 139: 1896-a: 349, nomen: 1912-a: 584: De Wildeman, 1919: B30; Breteler, 1973: XVII. Type: Cameroun, between Victoria and Bimbia, *Preuss 1275* (holotype: B†: lectotype: BREM: isotypes: B, M).

Note. The type material of *D. ferrugineum* represents a form of *D. heudelotii* with rather hairy leaves and branchlets, but it is linked by many intermediates to the more glabrous or early-glabrescent forms described as *D. acutisepalum* Engl., *D. adolfi-friederici* Engl., and *D. schweinfurthii* Engl. (see BRETELER, 1973: 43–44) and *D. cuneifolium* Engl. (see p. 32).

D. filamentosum Winkl. & Rapaios, nom. nud. = **D. madagascariense** Poir.

Note. This Ms. name has been found on *Winkler & Hanke 58* in the herbarium of Zürich. The specimen represents a form of *D. madagascariense* described before as *D. floribundum*.

D. filicaule Breteler, 1970: 10: 1973: 4, 27, 28, 33, 98, XVI: Punt, 1975: 29.

Type: Ivory Coast, N. of Aboisso, *Breteler 5923* (holotype: WAG: isotypes: B, BR, COI, EA, K, P, UCI, WU, Z).

Diagnostic characters. Thin liana or lianescent shrublet. Stem and branches solid, rarely not so, appressed-pubescent to strigose when young, soon glabrescent. Stipules narrowly triangular-subulate, 1–3.5 mm long. Leaves ca ovate-elliptic, 4–13 × 1–5 cm, usually cordate or subcordate at base, acuminate at top. Inflorescence small, usually not more than 10-flowered, shortly peduncled. Sepals usually erect or spreading, never all reflexed. Petals and stamens almost twice as long as the sepals. Pistil 2–3-merous, ovary velutinous. Fruits obovoid-ellipsoid, apiculate or not, smooth, glabrous, orange at maturity.

Description. Thin-stemmed liana, up to 1 cm in diam., lianescent shrublet, or shrublet. *Branches* dark-brown to black, solid, rarely not so, lenticellate, glabrous or glabrescent, smooth, later fissured with curled flakes: young orthotropic shoots usually very slender, densely sericeous-strigose, glabrescent. *Branchlets* appressed-pubescent to strigose, usually soon glabrescent. *Stipules* narrowly triangular to subulate, 1–3.5 mm long, appressed-pubescent to strigose. *Leaves:* petiole subterete, sometimes canaliculate above, up to 4(7) mm long, usually densely appressed-hairy: blade papery, mostly slightly bullate, oblong-elliptic to ovate-elliptic, 2–3 times as long as wide, 3–13 × 1–5 cm, usually cordate to subcordate sometimes obtuse at base, gradually acuminate at apex, the acumen 0.5–1 cm long, the midrib usually prominent above, with appressed hairs both sides, glabrescent, the 6–9 lateral nerves on each side usually glabrous, sometimes with a few appressed hairs below, the margin often hairy: glands both sides, usually inconspicuous, rather dispersed, often absent. *Inflorescences* rather small, up to 8(15)-flowered, appressed-pubescent: peduncle 1–3(6) mm long: bracts and bracteoles ovate-deltoid to narrowly triangular, up to ca 0.5 mm long. *Pedicel* up to ca 3 mm long, the upper part at most 1 mm long, appressed-puberulous. *Sepals* erect to somewhat spreading, rarely reflexed, but never all the sepals of a single flower, free or shortly united at base, narrowly oblong to narrowly ovate or obovate, 2–3 × 0.5–1 mm, obtuse to acute at apex, appressed-puberulous both sides. *Petals* erect or nearly so, shortly adnate to filaments at base, narrowly obovate in outline, 4–5 mm long, 0.5–1.5 mm split, glabrous or with a few hairs outside below split. *Stamens* 4–5 mm long, usually slightly longer than the petals, glabrous: anthers ca 0.5 mm long, connective usually slightly prominent. *Staminodes* rather flat, subquadrate to oblong, ca 0.3 × 0.3 mm, bilobed or emarginate at top, glabrous. *Pistil* 2–3-merous, 4.5–5.5 mm long; style glabrous or with a few hairs, 2–3-lobed, the lobes up to 1.5 mm long: ovary velutinous. *Fruit* obovoid-ellipsoid, apiculate or not, 2(–3?)-seeded, smooth, glabrous or



PHOT. 11. *D. filicaule*: flowering plant on roadside. (*Breteler 5503*: phot. F. J. BRETELER).

Cult. (seedlings). Ivory Coast. Adiopodoumé, *Breteler 6206* (WAG); *Cremers 351* (BR); *de Koning 4916* (WAG); *5182* (WAG); *5523* (WAG); *5488* (WAG); *Tolliez 304* (BR, P).

Cult. (seedling) Netherlands. Wageningen, *Breteler 6214* (WAG).

Notes. *D. filicaule* is closely related to *D. dictyospermum* from Ivory Coast and to *D. bodyi* and *D. cymulosum* from Western Central Africa. These species may be distinguished as follows:

- 1a. Peduncle very slender, (0.5)1–2.5 cm long: indumentum of the ovary like cotton wool. **D. dictyospermum**
- 1b. Peduncle up to 0.6 cm long: indumentum of the ovary short, erect-hairy. 2
- 2a. Leaves usually cordate to subcordate at base: sepals erect or nearly so in fully developed flowers. **D. filicaule**
- 2b. Leaves usually obtuse to rounded at base: sepals usually reflexed in fully developed flowers. **D. bodyi + D. cymulosum**
(see p. 47)

D. flabellatiflorum Haum. = **D. madagascariense** Poir.

D. flabellatiflorum Hauman, 1955: 342; 1958-a: 319; Breteler, 1973: XVIII. Type: Zaïre, Ikela, *Dubois 1021* (holotype: BR).

Note. The author classified his species near *D. floribundum* and *D. glandulosum* De Wild. He also found it closely related to *D. pynaertii* De Wild. All these names are synonyms of *D. madagascariense* and their types represent but slightly different forms of the same species. That HAUMAN's species is intermediate between the series *Contracta* and *Floribunda* of ENGLER (1912-a) is not amazing as in both series several synonyms of *D. madagascariense* can be found.

D. flaviflorum Engl. = **D. madagascariense** Poir.

D. flaviflorum Engler, 1912-b: 439; 1912-a: 570, nomen: De Wildeman, 1919: B30; Exell, 1927: 66; Exell & Mendonça, 1951-b: 323; Hauman, 1958-a: 299; Breteler, 1973: XVIII. Type: Zaïre, Aruwimi, *Mildbraed 3266* or *3299* (lectotype BM, see notes).

Notes. The original material of *D. flaviflorum*, i.e. the syntypes *Mildbraed 3266* & *3299*, was lost at Berlin. HAUMAN, who did not see any of this, mentioned *3299* as holotype, which is incorrect.

In BM a sheet is present annotated as '*D. flaviflorum* Engl.' and 'Type', both written in pencil by the hand of Mr. EXELL, who visited Berlin before World War II and brought some fragments to BM. The sheet contains a flowering

branchlet, a folded leaf, and a convolute with a few flowers. As these fragments represent the only type material still extant, the lectotype has to be chosen from it. There is, however, no indication from which syntype these fragments were taken. I designate the flowering branchlet as lectotype.

D. flaviflorum represents a form of *D. madagascariense*, mainly from the Congo basin, with rather constant characters in shrubby or treelike habit and hollow branchlets. The flowers, however, do not differ. As regards the habit, fieldwork will certainly reveal that shrubs or small trees may become lianas, as has been observed in several other species of *Dichapetalum*. Moreover, hollow branchlets occur quite often in other material of *D. madagascariense*. Therefore *D. flaviflorum* cannot be maintained as a distinct species, not even as a distinct infraspecific taxon.

HAUMAN (l.c.: 300) considered *D. flaviflorum* very closely related to *D. zenkeri* Engl., 'dont elle n'est peut-être qu'une variété'. As *D. flaviflorum* belongs in *D. madagascariense*, a species quite different from *D. zenkeri*. HAUMAN'S remark illustrates insufficient knowledge of specific criteria in *Dichapetalum*.

D. flavovirens Engl. = ***D. madagascariense*** Poir.

D. flavovirens Engler, 1912-a: 581; De Wildeman, 1919: B30; Breteler, 1973: XVIII. Type: South Cameroun (?), Campo area, near Akonangi, road to Mbam, *Tessmann 860* (holotype B†: lectotype: BM).

Notes. It is not clear whether the type specimen has been collected in South Cameroun or in adjacent Rio Muni, now a part of the Republic of Equatorial Guinea.

Although the fragment of the holotype in BM is very poor (leaves only), its identity leaves no doubt. ENGLER'S description also points clearly to *D. madagascariense*.

D. flexuosum (Oliv.)Engl. = ***D. madagascariense*** Poir.

D. flexuosum (Oliver)Engler, 1896-a: 349; 1912-a: 568; De Wildeman, 1919: B30; Hutchinson & Dalziel, 1928-a: 325; Aubréville, 1936: 4; Keay, 1958: 436; Breteler, 1973: XVIII.

Basionym: *Chailletia flexuosa* Oliver, 1868: 340. Type: Nigeria, Abbeokuta, *Irving 114* (lectotype: K).

Note. KEAY (l.c.) discovered that the common West African *D. flexuosum* of F.W.T.A. 1st ed. was earlier described as *Ceanothus guineensis* DC. and made the new combination *Dichapetalum guineense* (DC.)Keay. The latter, however, is conspecific with the older *D. madagascariense*.

There are two IRVING specimens included in the type cover at Kew, numbered 92 and 114. Neither of these specimens has ever been cited with number. *Irving 114* is selected lectotype.

D. floribundum (Planch.)Engl. = **D. madagascariense** Poir.

D. floribundum (Planchon)Engler, 1896-a: 348; 1912-a: 570; Pellegrin 1913: 648; Engler, 1915: 844; De Wildeman, 1919: B31; Hutchinson & Dalziel, 1928-a: 324; Keay, 1958: 437; Keay & al., 1960: 325; Breteler, 1973: XVIII.

Basionym: *Chailletia floribunda* Planchon, 1848: t. 792; Oliver, 1868: 340, including var. β : var. γ = *D. bocageanum* (Henr.)Engl. (see Breteler, 1973: 93). Type: Fernando Po, *Vogel 175* (holotype: K).

D. floribundum (Planchon)Engler var. *preussii* Engler, 1896-b: 137; De Wildeman, 1919: B31; Hutchinson & Dalziel, 1928-a: 324; Keay, 1958: 437. Type: Cameroun, Buea, *Preuss 904* (holotype: B†; lectotype: K, labeled '*Chailletia preussii*').

Note. The type material of *D. floribundum* and its var. *preussii* represent a form of *D. madagascariense* with large, widely-branched inflorescences and rather large leaves. Characters of the inflorescence and leaves vary widely in *D. madagascariense* and do not offer a good basis for specific segregation or infraspecific distinction.

D. fraternum Pierre = **D. gabonense** Engl.

Note. This MS. name of PIERRE has never been validated by PELLEGRIN as quoted in the Kew Index (1911–1915). The latter author (1913: 645), however, mentioned it as a manuscript name under *D. nitidulum* Engl. & Ruhl., a species which is conspecific with *D. gabonense*.

D. fructuosum Hiern

Fig. 18 Map 15

D. fructuosum Hiern, 1896: 138; De Wildeman, 1919: B31; Moss, 1928: 128; Exell & Mendonça, 1951-b: 324; Breteler, 1973: XVI; Punt, 1975: 19.

Type: Angola, Cuanza Norte, Cazengo, near Cabondo. *Welwitsch 1233* (holotype: BM; isotypes: COI, LISU).

D. oddonii De Wildeman, 1919: B55; Hauman, 1958-a: 301, p.p. (quoad typus). Type: Zaïre, near Sanda, *Oddon in Gillet 3569* (holotype: BR).

D. cinnamomeum Hauman, 1955: 342; 1958-a: 302. Type: Zaïre, Penge, *Bequaert 2166* (holotype: BR; isotype: WAG).

Diagnostic characters. Liana, lianescent shrub, shrub, or tree (?).

Branchlets densely to sparsely, subappressedly, short-brown-hairy, soon glabrescent or not. Stipules narrowly triangular, (1)3–6 mm long. Leaves glabrous or glabrescent, when dried often with rather conspicuous pale midribs and pale main lateral nerves. Inflorescences usually densely brown-hairy, (5)15 – many-flowered, distinctly branched, usually pedunculate, the peduncle free from the petiole or not. Pedicel slender or not, the upper part usually shorter than the lower. Sepals reflexed in fully expanded flowers. Petals erect-reflexed, bilobed. Ovary densely lanate, 3-locular. Fruit densely rusty tomentose.

Description. Liana, lianescent shrub, shrub, or tree(?). *Branches* glabrous or glabrescent, with a brown to black bark and with sparse, small lenticels. *Branchlets* densely to sparsely, subappressedly short-brown-hairy, soon glabrescent or not. *Stipulis* usually early caducous, narrowly triangular, (1)3–6 mm long, appressed-brown-hairy. *Leaves*: petiole semi-terete, often canaliculate or grooved above, 3–7 mm long, sparsely to densely subappressed-hairy, often soon glabrescent: blade elliptic to obovate-oblong, (1.5)2–2.5(3) times as long as wide, (5)9–14(20) × 3–6(8) cm, obtuse to cuneate at base, obtuse, rounded, or acuminate at apex, the acumen obtuse to acute, up to ca 2 cm long, with 5–8 pairs of main lateral nerves, the midrib flat or raised above, more prominent below, sparsely to densely subappressed-hairy on midrib and main lateral nerves both sides, usually very soon glabrescent, sometimes longer persistent on midrib above (not fully developed leaves may be hairy all over), glands small, inconspicuous, both sides. *Inflorescences* in the axils of normal leaves or several together on short, leafless, axillary shoots, the leaves reduced to scales or absent, (5)15 – many-flowered, up to 10 times branched, subappressed-brown-hairy or tomentellous: peduncle free from the petiole or adnate to it, (0)0.5–2(5) cm long: bracts and bracteoles deltoid to narrowly triangular-subulate, 0.5–1.5(3) mm long. *Pedicel* up to 6 mm long, the upper part (0)1–2 mm long, densely appressed-short-hairy. *Sepals* reflexed in fully developed flowers, ovate-elliptic, 2.5–5 × 0.75–1.25 mm, rusty to pale-brown short-hairy outside, inside sparsely so. *Petals* suberect to reflexed, slender with rather flat lobes or obovate in outline with more concave lobes, 2.5–5 mm long, 1–2.5 mm split, glabrous or with a few stiff, subappressed hairs outside below split. *Stamens* erect or nearly so, (2.5)3.5–5.5 mm long, glabrous. *Staminodes* subquadrate to ovate-oblong, up to 1 × 0.5 mm, glabrous or with a few curly hairs. *Pistil* 3-merous, 3.5–5 mm long: ovary densely lanate: style glabrous or with a few hairs, 3-lobed at top. *Fruits* (mature?) 1–2(3?)-seeded, when 1-seeded obovoid-ellipsoid, the axis perpendicular to the stipe, 1–1.5 cm long, ca 0.75 cm in diam., shortly apiculate, rusty tomentose: endocarp glabrous inside.

Distribution: From Nigeria to Angola and S.E. Kenya. Not collected in Cameroun and Congo.

Ecology: Rain forest, semi-deciduous forest, at low and medium altitudes.

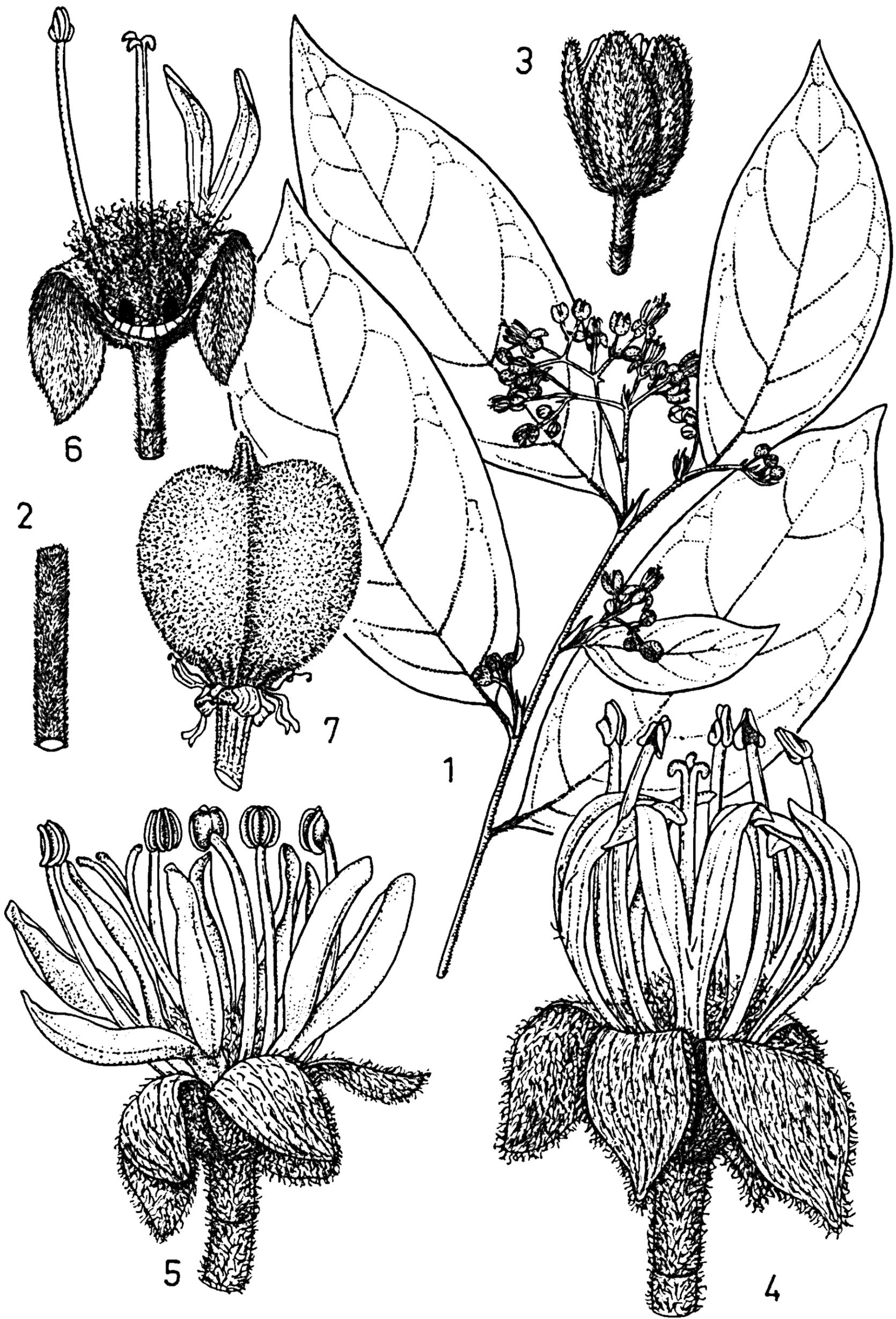
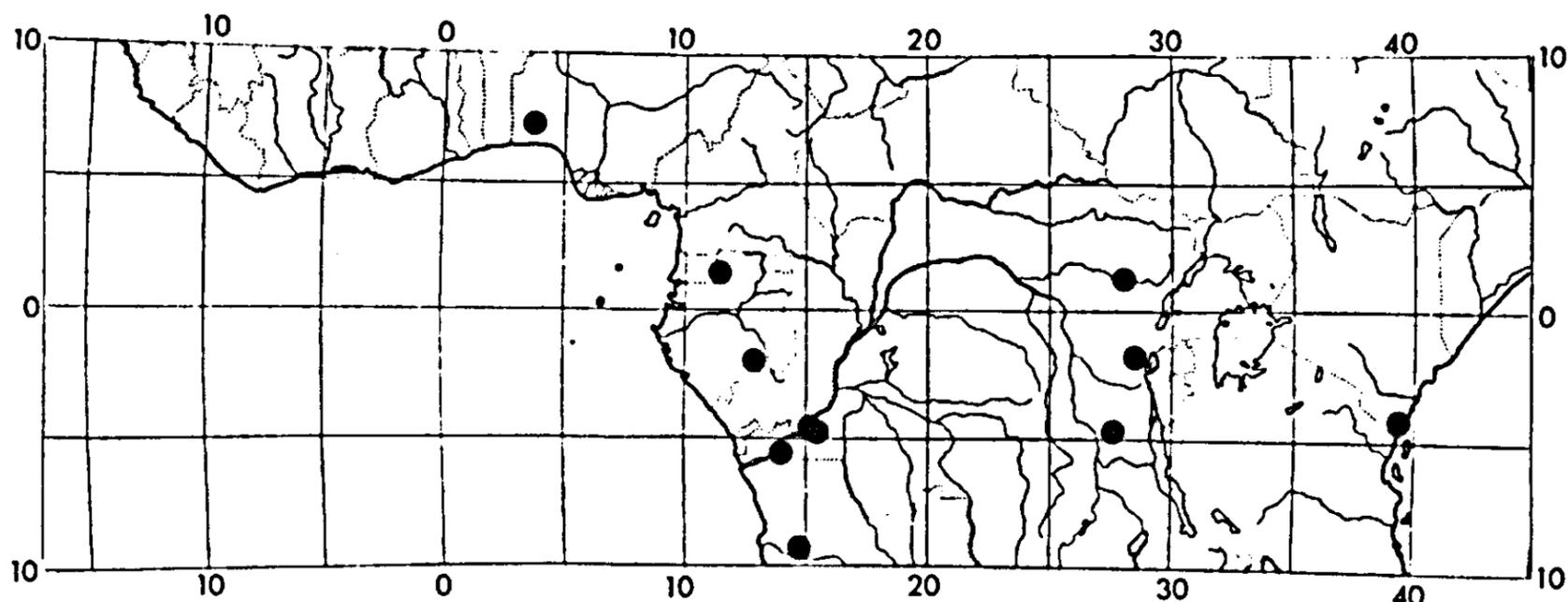


FIG. 18. *D. fructuosum*: 1. flowering branchlet, $\frac{5}{6} \times$; 2. detail of branchlet with indumentum, $2\frac{1}{2} \times$; 3. flower bud, $5 \times$; 4-5. flowers, $10 \times$; 6. flower in part, $7\frac{1}{2} \times$; 7. 2-seeded fruit, $2\frac{1}{2} \times$. (1-4, 6. Troupin 4046; 5. Magogo & Glover 179; 7. Oddon in Gillet 3569).



MAP 15. *D. fructuosum*

Specimens examined:

Nigeria. Ibadan South Res., *Chizea* FHI 24486 (FHI, K, P).

Gabon. 60 km S.S.W. of Moanda, *Breteler* 6918 (WAG); Oyem, *Le Testu* 9526 (BR, P, WAG).

Zaïre. Penge, *Bequaert* 2166 (BR, WAG, type of *D. cinnamomeum*); Kizulu, *Compère* 980 (BR); Lutendele, *Jans* 286 (BR); Wamaza, terr. Kabambare, *A. Léonard* 5728 (BR, P, WAG); Sanda, *Oddon in Gillet* 3569 (BR, type of *D. oddonii*); Km 110 Kavumu-Walikale, *Troupin* 4046 (BR, K, WAG).

Angola. Cazengo, near Cabondo, *Welwitsch* 1233 (BM, COI, K, LISU, type).

Kenya. Shimba Hills, *Magogo & Glover* 36 (BR, EA, FI, K); 179 (EA, FI, K, P, WAG).

Notes. Although the type of *D. fructuosum* has been collected with fruits only, characters of the branches, the leaves and the infructescence show clearly that it belongs to the same species as the flowering material described as *D. oddonii* and as *D. cinnamomeum*.

Apart from the type, HAUMAN (1958-a: 301) cited two specimens (*Toussaint* 2097, *Vermoesen* 1486) as belonging to *D. oddonii*, but they belong to a quite different species, conspecific or closely related to *D. barteri* Engl. (see BRETELER, 1973: 86).

D. fructuosum is most closely related to *D. arachnoideum* Bret. It differs from the latter by lacking the arachnoid leaf indumentum and the strongly glandular leaf-top. From *D. brazzae* Pellegr. and *D. librevillense* Pellegr. it can easily be distinguished as these species also have strongly glandular leaf-tops. Moreover, freshly cut branches of *D. brazzae* and *D. librevillense* produce an exudate which is not seen in *D. fructuosum*.

D. fulvialabastrum De Wild. = *D. madagascariense* Poir.

D. fulvialabastrum De Wildeman, 1919: B31; Hauman, 1958-a: 321 (as *D. glandulosum* De Wild. var. *fulvialabastrum* (De Wild.) Haum.): Breteler, 1973: XVIII. Type: Zaïre, Mobwasa, *Reygaert* 820 (lectotype: BR).

Note. DE WILDEMAN distinguished his species from *D. aruwimense* Engl., also a synonym of *D. madagascariense* (see BRETILER, 1973: 68), by the more compact inflorescences and by its smaller flowers with less deeply lobed petals. These characters are very variable, sometimes even on a single specimen, and are quite useless in specific segregation (see also HAUMAN's note (l.c.: 320) regarding *D. glandulosum* and related species).

D. fuscescens Engl. = *D. heudelotii* (Planch. ex Oliv.)Baill.

D. fuscescens Engler, 1912-a: 594; De Wildeman, 1919: B33; Engler & Krause, 1931: 9; Breteler, 1973: XVII. Type: Cameroun, near Mimfia, Zenker 3874 (holotype: B†; lectotype: WU; isotypes: BM, BR, COI, E, GOET, L, LE, M, MO, P, PRE, W, WAG, Z).

Notes. ENGLER's classification (l.c.) of *D. fuscescens* in his section *Tapurina* § *Longitubulosa* together with *D. longitubulosum* Engl. and *D. aurantiacum* Engl. (= *D. longitubulosum*) is remarkable because the type material belongs without any doubt, in *D. heudelotii*. *D. longitubulosum* can easily be distinguished from *D. heudelotii* by its tubular calyx and by petals and stamens which are united into a long tube. From the original diagnosis it is at once clear that ENGLER described a *D. longitubulosum* flower and not a *D. heudelotii* one. So this part of the description is in accordance with his classification. As regards ENGLER's description of the vegetative parts and inflorescences, however, all the isotypes of *D. fuscescens* fit this description very well.

It is suggested here that ENGLER may have described by mistake a flower of an alien specimen among his numerous new species, or that in fact the holotype consisted of a mixture of the two species involved. As the original material was destroyed in Berlin, the truth of the matter shall remain unknown. As an important part of the description fits the isotypes very well, I have decided to place *D. fuscescens* in synonymy of *D. heudelotii* and have lectotypified it accordingly.

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